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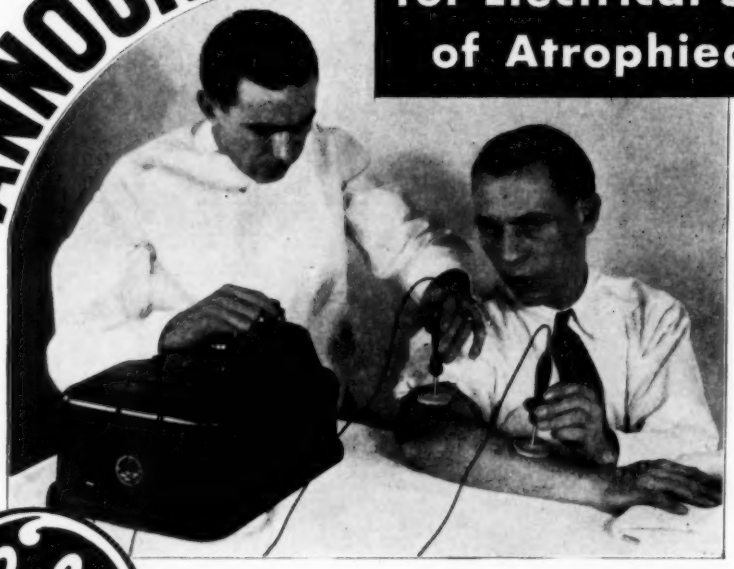

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SPECIFIC THERAPEUTIC EXERCISE IN CERTAIN ORTHOPEDIC CONDITIONS *

J. C. ELSOM, M.D.

MADISON, WIS.

Exercise, properly graded and intelligently directed, is profound in its therapeutic effects, but generally not sufficiently appreciated by the members of the medical profession. I regard specific forms of exercise, active and passive, as an important and integral agency in physical therapy. We do not appreciate, perhaps, the large and vital part the muscles play in metabolic processes and in the human economy. Physical activity in reasonable and adequate amount promotes vigor, efficiency, health, happiness, skill and coordination. Inactivity, on the other hand, results in deterioration, atrophy, disturbances of bodily functions, and hence impairment of general health. Similar statements might be made as to the necessity and values of mental activity. "*Mens sana in corpore sano*," that is to say, a normal mind in a healthy body, is as desirable and necessary today as when it was first pronounced by the Roman sages thousands of years ago.

"Function makes structure" is a biological fact, as well as the reverse: structure makes function. To maintain proper structure of muscles, joints, cartilaginous, glandular and other tissues, there must be reasonable and adequate function to preserve and maintain the most healthful and resistant structure.

Exercise, of course, accelerates the circulatory process. Nature accomplishes its healing effect by bathing the injured or diseased parts in the nutritive fluids of the body. When the blood stream diminishes, repair and nutrition are correspondingly reduced. Thus exercise is a profound regulator of nutrition; therefore it seems reasonable that in many abnormal conditions exercise should be prescribed, and with accuracy as to kind, amount, degree, and frequency of administration. The physician prescribes drugs in this fashion, but unfortunately, his prescription of exercise is often not so precise. "What is one man's meat is another man's poison": exercise suitable for one individual might be disastrous to another. Likewise, the kind and degree of exercise administered today may not be suitable for the same patient tomorrow. The character of exercise should vary according to the age of the patient, as well as his present condition. Obviously, the prescription of exercise requires knowledge and diagnostic acumen of no mean order. Many conditions exist in which absolute rest is essential. The knowledge of when to go and when to stop is necessary not only in regard to exercise, but also in the application of every other physical agency. The therapist must have an unusual amount of discrimination, powers of reasoning, accuracy, moderation and good judgment.

Exercise for therapeutic purposes should be given rather slowly, steadily, and purposefully, with a brief period of rest between individual muscular contractions. This is a far better method than short, jerky movements which the patient is apt to make if improperly instructed. Further, muscular effort should be made to carry the joint which is being treated through the largest excursion that may be possible; at least the greatest extent of movement which may be done without great pain. This type of exercise, performed by the patient alone, we call *active* exercise; it is usually the most beneficial form. *Passive* exercise consists of movements performed on the patient by an operator. The force exerted in the passive movement of a joint may be very slight, or great, according to the condition of the part being treated. As a rule, the application of heat in some form is desirable before the beginning of either active or passive exercise.

Assistive exercise is that type in which the patient is not quite able to move a joint to the desired extent, and is assisted more or less by the operator. This type is especially beneficial in the various form of paralysis. *Resistive* exercise is given to advantage when the muscles are fairly strong; the operator offers manual resistance to movements, supplying a

* Read at the Thirteenth Annual Session of the American Congress of Physical Therapy, Philadelphia, September 13, 1934.

heavier load against the voluntary muscular action of the patient. Muscular strength and development is secured best in this way. The resistance may be slight or heavy according to the strength of the patient; but no muscle should be pushed to its maximum ability. Each exercise should be well within the capacity of the individual performer.

Specific Exercises

Hernia. A previous paper * has been presented by the writer on the value of certain types of exercise useful in the prevention of hernia and in its post-operative treatment. The point was brought out that in most cases of hernia there is found to be a weakness of the abdominal muscles, especially the internal and external oblique, which are concerned in the formation of the inguinal ring. The recti muscles, which are commonly used in abdominal exercises are not so important from a corrective point of view. Therefore the movements which twist the body from side to side, side-bending movements and the like are most valuable.

Many movements used in wrestling are strenuous in this respect, as also in most other athletic games. Rolling over on the grass, or on mats, right and left, so commonly practiced by children, is a splendid abdominal exercise. A patient convalescent from a herniotomy may hasten his recovery by mild exercises of rotation of the trunk and pelvis, with or without resistance. The operator may place his hand on the shoulder of a supine patient and offer varying degrees of resistance, while the patient tries to turn his body, shoulder, and pelvis first in one direction and then in another. A further exercise of value is one which the patient takes while seated on a stool, his feet supported under a radiator or some similar method. The movement consists of placing the hands on the hips, bending backward a little, and from this position turning the whole body sharply to the right and then to the left. The exercise should be done slowly. Many forms of exercise may be taken while the patient is lying on his back. These forms are often desirable in some post-operative cases, because of the lessened strain on the heart in the recumbent position. Active movements of raising the knees to the chest, with or without resistance, leg-raising and spreading, the so-called "bicycle" movement, raising and rotating the legs, are all good. Simpler and less disturbing exercises consist of voluntary contractions and relaxations of the abdominal muscles, with a kind of pumping movement, which is in reality a form of abdominal massage stimulating the viscera and increasing the circulation, both arterial and venous. Simple blowing movements, as if blowing up a rubber bladder, involve considerable exercise to the abdominal muscles, and are useful in strengthening these organs when indicated post-operatively.

Fractures. Any local treatment or manipulation around the site of a fracture was usually taboo in the last generation or two. Splints and casts were usually applied and the limb kept as nearly immobile as possible for six or eight weeks. At the end of this treatment there was obvious atrophy of muscles within the neighborhood of the fracture, and usually a very considerable ankylosis of near-by joints. After the healing of the fracture, much time had to be spent in attempts at restoration of the function of joints and muscles, and recovery was much delayed. Today the treatment by physical means has been a distinct improvement in lessening the period of disability. By means of careful massage, the application of heat, and gentle movement of surrounding joints, the healing process is hastened, callus formation is stimulated, and the muscles and joints are more quickly brought back to normal function. The advantages of early treatment are well given by Tidy,* who says: "In the physical treatment of fractures there are included massage and movement; electrical treatment; heat and light. The old or classical treatment of fractures often assured good *anatomical* result, but since in the meantime the joints had become stiff, and the muscles wasted, the *functional* results often left much to be desired. The early use of massage and movement meeting much opposition at first, has now been largely adopted. Possibly some of its practitioners have shown a lack of judgment in applying it, but unquestionably the method has been of immense value to victims of these accidents."

In the physical treatment of fractures, the stages of the fracture must be well considered. For convenience we may divide these stages

* Archives Physical Therapy, X-Ray, Rad. 14:531 (Sept.) 1933.

* Tidy; Massage in Remedial Exercises. Wm. Wood & Co.

into three; first, the acute or recent, before ossification has begun. Here muscular spasm, pain and swelling are prominent. Adhesions tend to form very rapidly, within a few days after the initial trauma; swelling is often extensive, and both swelling and adhesions affect neighboring joints. There is passive congestion and more or less ankylosis. Tendons may adhere to their sheaths, causing further limitation of movement. In the physical treatment of this stage we should endeavor to relieve pain and congestion, to promote active circulation, and to prevent the formation of adhesions. To this end, heat and massage, very light at first, should be applied; stroking movements above and below the site of injury should be given, providing in all cases adequate support to the limb and handling the injured area with greatest caution.

Heat treatment may be begun at once, massage after a very few days, followed by active movements of neighboring joints. A patient with Colles' fracture, for example, may move his fingers from the first, and in a day or two the elbow and shoulder. These movements need not include the whole excursion of the joints; small degrees of movement are better. In some cases, movement of the surrounding joints should be postponed until a degree of union has occurred. Active movements are preferable, because the patient himself will instinctively avoid any movement which causes pain. Passive movement may be overdone very easily, especially in the early stages of fracture. Any increase of pain or swelling after physical therapy treatment is an indication that it has been carried too far and has been too severe. In all cases, the limb should be placed in a comfortable position, supported by pillows, and in recent cases the treatment is best done while the part is in a splint or half cast, or even in a sling.

In the second and third stages, the chief aim is to secure muscular strength as well as freedom of movement. The sinusoidal currents may here be of advantage. The patient should be encouraged to make active use of the limb, without putting upon it an undue amount of strain. In the third stage the bones are quite well united, and if pronounced adhesions are present, force in the use of passive exercises may be employed. Massage should be strong and vigorous.

Specific Exercises for Wrists and Fingers

The movements here described are intended for increasing function of the muscles and joints, and are applicable not only in convalescence from fractures near the wrist, but in other conditions of partial ankylosis caused by other traumatic, or diseased conditions, such as arthritis, tenosynovitis, fibrositis, contractions from burns, and the like.

Wrist. Flexion and extension and lateral movements. Passively, the exercises may be administered by the patient himself, who uses his well hand to give exercises to his injured wrist. In case of an injured right wrist, the patient places his left palm underneath and across the right, the left thumb across the metacarpophalangeal joints. Passive extension is thus applied to the right wrist. Reversing the position of the operating left hand, forcible flexion may be given. These movements, of course, may be applied in similar fashion by an operator.

Another good method of applying extension exercise may be done by the patient alone. With the arm outstretched, in front of the chest, the palms of the hands are placed in close contact and kept in this position while the hands are brought toward the front chest wall. This is easy enough in normal wrists, but difficult in partial ankylosis.

A splendid exercise for wrist flexion and extension, as well as for the fingers is in the use of a short round wooden rod, similar to a rolling pin. This may be used by the patient holding the rod in both hands, one palm up and the other down. By twisting and rolling movements, one hand resisting the action of the other, fine exercise may be gotten. An operator may hold the rod and offer resistance, while the patient tries to make as complete movements in flexion and extension as may be possible. Many forms of occupational therapy, the use of tools, and the like, are valuable in the treatment and hands and wrists.

Fingers. (1) *Extension.* Active exercises may be done simply by voluntary movements. In addition, the patient may place his flexed hand and forearm on a table or other smooth support, and without moving the elbow try to push small objects away by forcible extension of his fingers alone. He uses a kind of flipping movement. The heavier the object, the more difficult the exercise, of course.

(2) *Flexion.* Squeezing a small rubber ball, or a piece of paper made into a circular wad is a good form of exercise. Each squeeze should be as vigorous as possible, rather slowly done, with rest periods between each series of muscular contractions. Passive flexion of the fingers may be done by an operator, or by the patient himself. A good method of passive flexion is secured when the patient places his partially bent fingers on a table, rolling the back of the hand forward. By changing the position of the hand, all of the phalangeal and metacarpal joints may be exercised.

Supination and Pronation. When a patient deficient in these movements is asked to perform them, if his arm is outstretched, he will probably attempt the movement by rotating the humerus. This masks the movement and sometimes may be deceptive. The patient should be directed to flex the elbow to about a right angle and to hold the elbow close to the side of his body. A better position is this: if the right arm is to be exercised, the patient places his left arm behind his back, and grasps the right elbow with his left hand, thus holding it firmly to his side. From this position, strong exercises of pure supination and pronation may be obtained.

More active exercises of pronation and supination may be obtained by the use of a short wooden rod. A weight of a pound or two may be fastened to the end of the rod, or the operator may offer manual resistance to the movements. The use of a screw driver is a good exercise. Putting in screws in a soft wooden board exercises the supinations; taking the screws out, the pronators.

Shoulder movements. Previous to the application of exercise, massage should be given to all the muscles of the shoulder girdle, and deep friction to the ligaments in order to stretch adhesions. Swinging movements of the arm, forward and backward, and sideward across the chest, are valuable. These increase mobility of the joint, and the antagonistic muscles are not so liable to be thrown into contraction as when passive movements are given by an operator. Rotation of the humerus may be done by holding the elbow flexed at a right angle, with sideward swinging of the forearm from right to left. Abduction of the shoulder is well given by the use of the "finger ladder," which consists of a wooden board fastened to a wall. The board should be about three feet long, the center of which is about the average shoulder level. Corrugations or slits are a part of this apparatus, along which the patient moves his fingers upward, thus abducting the shoulder as much as may be. The patient should stand with his side to the ladder, far enough away to allow the arm to be kept straight. His body must be held erect while he does the finger crawling movement. In place of this apparatus, a plain wall makes a good substitute.

Stiff Knee. Passive movements: (Tidy.)

1. Lateral movement of the patella.
2. Flexion and extension of the knee.
3. Rotation in and out with the knee in semiflexion.

Active movements:

1. Sitting on edge of table, free leg swinging.
2. Rowing machine with sliding seat.
3. Stationary bicycle riding.
4. Squatting movements from standing position.
5. Half kneeling position; the patient kneels on the sound knee, the injured one half bent, with foot advanced. He then bends forward over the front knee, forcing it into flexion. A series of small movements backward and forward may be made when the limit of movement has been reached.
6. If the ankylosis does not prevent, the patient kneels on both knees, and then tries to assume the sitting position, buttocks approaching the calves.

Summary and Conclusions

Therapeutic exercise is valuable and essential in many orthopedic and post-operative conditions. It aids in the restoration of function, but must be intelligently prescribed and administered. Each patient presents an individual problem. A brief series of suggestive exercises has been outlined; certain ones suitable for particular cases only. The physical therapy technician must possess a good knowledge of gross anatomy and kinesiology. The physician must prescribe and direct exercises suitable to the needs of each individual case.

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(Discussion of this paper will follow in a succeeding issue.)

THE DIAGNOSIS AND MANAGEMENT OF CUTANEOUS CANCER *

GEORGE M. MacKEE, M.D.
And
ANTHONY C. CIPOLLARO, M.D.
NEW YORK

Statistics show that approximately ten per cent[1] of the deaths due to cancer in the registration area of the United States are caused by cancer of the skin and orificial mucous membranes — in other words, cancer of accessible parts. Cancer not being a reportable disease, it is probable that the incidence and even the mortality of cutaneous cancer are considerably greater than is shown by the statistics, but at the present moment a higher incidence cannot be proved. Cancer, in the early stage, before it becomes invasive and before metastasis occurs, is curable. In the absence of a specific, that is a certain cure for advanced cancer, the essential requirement for cancer supervention is therefore its recognition in the early stage and the immediate institution of modern conventional therapy. Such attainment is often impossible in the case of primary visceral cancer; but it is possible in the majority of cases of primary cutaneous cancer. Even more than this can be accomplished. Many, if not most cutaneous cancers develop in a long-standing antecedent, recognizable lesion which, as a rule, can be permanently eradicated. This question of the so-called precancerous dermatoses is very important, but its discussion cannot be included in this paper. Suffice it to emphasize that if all or most of the precancerous cutaneous lesions and very early cutaneous cancers were permanently destroyed, cancer mortality would be reduced at least ten per cent.

There is, as yet, no universally accepted classification of cutaneous malignant neoplasms. Many pathlogists prefer terms such as sarcoma and carcinoma, the former being divided into the usual well-known types, while the latter are divided into epidermoid, non-epidermoid, and so on. We prefer to adhere to the following general classification used by dermatologists for many years:

1. Basal-cell epithelioma.
2. Basal-squamous-cell epithelioma.
3. Squamous-cell epithelioma.
4. Transitional-cell epithelioma (transitional-cell epidermoid carcinoma, Ewing[2]).
5. Paget's disease.
6. Bowen's disease.
7. Melanomas.
8. Sarcomas.

Basal-Cell Epithelioma

The basal-cell epithelioma is thought to arise from the basal-cell layer of the cutaneous appendages or from similar cells of the epidermis that were predestined to form such appendages. They are composed entirely of basal cells. They may develop in apparently normal skin or in one of the precanceroses. They probably never cause metastases. They probably never occur primarily in the mucous membranes, although they frequently involve such structures secondarily. The same statement applies to subcutaneous tissue. They are very radiosensitive and when only the skin is involved they are, as a rule, easily cured. When not cured or controlled, they are likely to invade the deeper structures, ulcerate and cause profound mutilation. Ulcerated lesions are often called rodent ulcers.

Clinically, the affection varies markedly in appearance due both to type and stage of evolution. Usually the rate of growth is slow; a slow evolution over a period of several or many years. It is rarely encountered in late adolescence and early adult life; it is common in the fourth and fifth decades, and very common thereafter. The sites of predilection are the face and trunk, but hardly any part of the cutaneous surface is exempt.[3]

A common form is the so-called nodular type. The nodule of basal-cell epithelioma is characterized by a mother-of-pearl appearance. It ranges in size from the head of an ordinary pin to a small pea. There may be a single nodule, or a lesion may be composed of several or many discrete, aggregated or con-

* From the Department of Dermatology, New York Post-Graduate Medical School, Columbia University.
* Read at the Thirteenth Annual Session of the American Congress of Physical Therapy, Philadelphia, September 13, 1934.

fluent nodules. Not infrequently, a characteristic rolled edge is constructed by the aggregation of many small nodules. Often, there is more or less telangiectasia. Nodular lesions may be of almost any size. With the exception of the waxy, semi-transluscent nodular element, the color is dark red, brownish red, or dark brown. The lesion may remain nodular for years. Sooner or later they are likely to ulcerate. The ulcerated lesion may retain its rolled edge — a very characteristic and common clinical picture. When the ulceration is superficial it is covered, most of the time, by a crust. Nodular lesions have to be differentiated particularly from the

Fig. 1. — Early nodular basal-cell epithelioma.

Fig. 2. — Nodular basal-cell epithelioma with central ulceration and crusting.

nodular and nodulo-ulcerative syphiloderm and lupus vulgaris.

The so-called flat type is fairly common, but is seldom diagnosed except by those who are familiar with its characteristics. The lesions range in size from a pinhead to an adult palm. It may be level with the normal skin surface or slightly elevated in places. Mother-of-pearl nodules are seen occasionally. The surface, usually dry and smooth, may be scaly and at times, exudative. The margin is well defined and often there is a delicate, almost imperceptible, pathognomonic rolled edge. The color is dark red or brownish red. It increases in size by peripheral extension. Occasionally the center becomes atrophic or cicatrized in which case configuration is produced. There may be a single lesion, often several and not infrequently many. The flat type is often mistaken for psoriasis, eczema, syphilis, tuberculosis, Bowen's cancer and Paget's cancer.

There are several less common types of basal-cell epithelioma, one of which is important; namely, the deep type. Of course, any type may become deep, but this type begins as a nodule deep in the skin or in the subcutaneous tissue. At first it can be detected only by palpation. Very often this type is not diagnosed or even suspected until considerable subcutaneous tissue has been invaded.

Occasionally, a basal-cell epithelioma may

Fig. 3. — Nodular basal-cell epithelioma with ulceration, crusting and cicatrization.

Fig. 4. — Ulcerating basal-cell epithelioma with involvement of important deep tissue.

be covered with moist, foul-smelling vegetations; or it may be papillomatous, forming a cauliflower-like tumor; or it may be verrucous. Lesions of this kind may be confused with syphilis, tuberculosis, blastomycosis, bromoderma, and iododerma.

A somewhat rare but very interesting type is the morphea-like epithelioma. The lesion is flat, somewhat oval in contour and sharply marginated. The involved area may be atrophic and slightly depressed, or slightly thickened and elevated. The color is yellow-

ish and there is usually some telangiectasia. There may be a delicate rolled edge. The surface is smooth and shiny. This type is usually mistaken for a patch of scleroderma or morphea.

Basal-cell epitheliomas are at times deeply pigmented in which case they may be mistaken for a melanoma.

Treatment. Basal-cell epitheliomas respond favorably to any of the established therapeutic methods. The method or combination of methods should be selected in accordance with location, age, depth, parts involved, and previous treatment. Inasmuch as metastasis does not occur and the grade of malignancy is very low, one may give consideration to the cosmetic result.

Basal-Squamous-Cell Epithelioma

It has long been known that between 12 and 15 per cent of basal cell epitheliomas contain squamous or prickle cells. Curiously, it

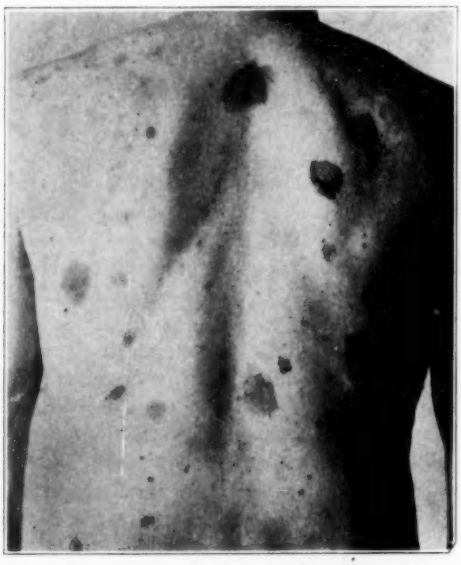

Fig. 5. — Flat type of basal-cell epithelioma.

is about this percentage of cases that has proved unusually stubborn. Hamilton Montgomery[4] found this type of epithelioma in 12.6 per cent of a series of 119 cases of skin carcinoma most of which, clinically, were of the basal cell type. It is difficult, often impossible, to clinically differentiate between a pure basal-cell epithelioma and one that contains prickle cells, especially in the early stage of evolution. The latter may evolve more rapidly, is less likely to contain mother-of-pearl nodules, may involve the mucosa secondarily, may cause metastasis, and is more recalcitrant. Often, it is difficult to differentiate between the two types histologically as the squamous element may appear in only a few of numerous serial sections. Montgomery believes that the basal-squamous-cell type represents a metamorphosis of basal-cell into squamous-cell epithelioma and is not a degenerate form of the latter. Naturally, the prognosis is much less favorable than for the pure basal-cell neoplasm.

Treatment. We prefer scalpel surgery or surgical diathermy for this type of epithelioma, often combined with x-rays or radium.

Squamous-Cell Epithelioma

The primary cutaneous squamous or prickle-cell epithelioma is derived from the squamous cells of the epidermis or of the skin appendages. Histologically, the neoplasm is composed of squamous cells many of which retain their prickles and there is a varying amount of cornification or pearl formation.

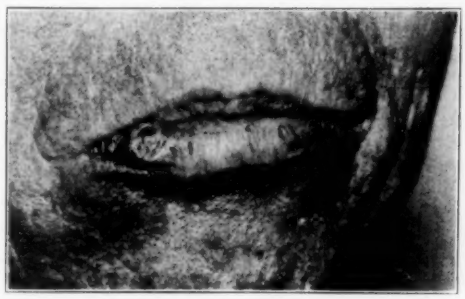

Fig. 6. — Early squamous-cell epithelioma of mucous membrane of lip.

It occurs about half as frequently as does basal-cell epithelioma. They develop most frequently in the mucous membrane of the lips and mouth, less frequently on the penis, vulva, eyelids, and nose. When occurring in the skin, the most common locations are the scalp, dorsal surfaces of the hands, and the ear. Certainly in the majority of cases, the malignant growth is preceded by an antecedent lesion such as a keratosis, leukoplakia, kraurosis, erythroplasia, syphilitic interstitial glossitis, cicatrix, and the like. The majority of patients are over 35 years of age.

The neoplasm may begin as an ulcer or a nodule. Ulcers are usually indurated. Nodules continue to grow in size to form a tumor which is usually hard but may be soft and

as a rule, is opaque rather than semi-translucent as in basal-cell epithelioma. Nodules and tumors often ulcerate, but usually, there is less mutilation than in the case of rodent ulcer. At times the lesion is verrucous, vegetating, or papillomatous. Most often there is but a single lesion. Occasionally there are several. When occurring in scar or sclerotic tissue, or when of a comparatively low grade

Fig. 7. — Advanced, neglected squamous-cell epithelioma of lip.

of malignancy, the tumor may evolve slowly and metastasis may be delayed. Otherwise evolution is rapid and metastasis occurs early.

The affection must be differentiated from syphilis, tuberculosis, basal-cell epithelioma, benign ulcers, and other conditions. At times it is very difficult to determine, either clinically or histologically, whether there is a neoplasm or an unusual form of benign hyperplasia at the margin of an old ulcer.

Squamous cell carcinoma may involve the skin secondarily. An example of such involvement is cancer *en cuirasse*.

Treatment. In general, we consider squamous cell epithelioma to be a surgical problem. The excellent results of x-ray and radium therapy cause one or the other to be the method of election in selected cases. Frequently it is advisable to irradiate the area either before or after surgical intervention, or both, and to irradiate the neighboring lymphatics.

Transitional-Cell Epithelioma

This neoplasm arises from structures that are rich in squamous cells as, for example, the tongue, floor of the mouth, tonsils, pharynx, ducts of mucous glands, etc. They are composed of rather small cells which are cuboidal or spindle shaped. They excite little growth of connective tissue. They are, according to Ewing,[2] markedly radiosensitive. The primary growth is usually very small and metastasis is likely to occur early in the adjacent lymph nodes. The surface is often finely granular and flat, giving the appearance of an erosion rather than of an ulcer or neoplasm. Clinical evidence of infiltration is usually absent. For these reasons the affection is often overlooked and the first evidence of its presence to be noted by the patient may be glandular enlargement.

Treatment. X-rays or radium would seem to be indicated in this type of epithelioma, alone or combined with surgery.

Paget's Disease

While there is no unanimity, the consensus of opinion with which we are in accord, is that this affection from the very beginning is a carcinoma of the intra-epidermal portion of the mammary duct and of the skin — in other words, an intra-epidermal carcinoma. It occurs most commonly in one or both breasts of women, rarely in men, and occasionally it is encountered on other parts of the body. The distinctive microscopical picture consists of dyskeratosis and the so-called Paget cell — a sharply defined, large epithelial cell, which contains a single, large, deeply stained nucleus.

The clinical picture of Paget's cancer of the nipple varies. The usual picture is that of a sharply marginated, eczematoid lesion surrounding the nipple. The eruption does not yield to any of the remedies used for eczema, including small doses of x-rays. The stubbornness, location, age of the patient (usually over 35), sex, sharp margin, persistent erosions, infiltration and retraction of the nipple, should make one suspicious of the true nature of the affection. Evolution is slow, but sooner or later there is evident carcinoma of the breast with metastasis to the axillary glands.

Instead of an eczema-like eruption, the condition may consist of infiltration of the nipple, or the nipple may be keratotic or verrucous, and it is usually retracted; or there may be a sharply defined area of thickness around the nipple having a delicate rolled edge.

The clinical characteristics of extramammary Paget's cancer are much the same as the mammary type. It has occured on the penis, scrotum, perineum, pubic region, umbilicus, lip, nose, cheek, forearms, trunk, ears, and tongue. Clinically, it may resemble Bowen's cancer, eczema, psoriasis, and the flat type of basal cell epithelioma.

Fig. 8. — Squamous-cell epithelioma of low grade of malignancy of hand.

Treatment. It is our opinion that a mammectomy should be performed as soon as the diagnosis is established. In late cases, it may be necessary to remove the axillary glands and irradiate.

Bowen's Disease

This, also, is an intra-epidermal carcinoma. It may give rise to a basal-cell epithelioma or a squamous-cell tumor of a low grade of malignancy. There may be one or several lesions. Clinically it resembles extra-mammary Paget's disease, the flat type of basal-cell epithelioma, psoriasis, eczema, etc. It seldom causes metastasis and is easily cured. We prefer surgical excision or destruction with surgical diathermy.

Melanoma

The term melanoma is used here to designate a malignant neoplasm, usually deeply pigmented, but at times containing little or no pigment, originating from a nevus composed of cells derived from the epidermis. They are melanocarcinomas. The term melanosarcoma has been incorrectly used as a synonym. The latter are rare and arise in the choroid coat of the eye and in the blue nevus of Tieche.[7] The type of nevus that most frequently gives rise to melanoma is the blue-black or slate-colored, smooth, flat, hairless mole that is either a macule or slightly elevated. According to clinical and histological characteristics, various terms have been applied to these neoplasms — melanoma, melanocarcinoma, nevocarcinoma and so on. While the grade of malignancy varies, it is apt to be high and metastasis is likely to occur early; therefore, the prognosis is unfavorable.

Treatment. The responsibility, even in early cases, is unusually great and a decision on the therapeutic method equally as difficult. We prefer a wide, deep excision combined, at times, with irradiation.

Sarcoma

Sarcomas of the cutaneous envelop are the least common of the malignant neoplasms. They are formed of immature connective-tissue cells. In the non-pigmented tumors, the cells may be of the small or large round variety, spindle shaped, or the mixed-cell variety. The small round cell sarcomas are the most malignant, while the fibro-sarcomas and giant cell sarcomas are least so. In addition to these conventional types there are several others; namely, lymphosarcoma, melanotic whitlow (melanoblastoma of the nail bed), neurogenic sarcoma and the idiopathic multiple hemorrhagic sarcoma of Kaposi. The last is thought by some investigators not to be a neoplasm, but at present the consensus is that it is sarcoma of a low grade of malignancy. Cutaneous sarcomas may be single or multiple, primary or secondary. As a rule, they are easily diagnosed, but they may be mistaken for a benign nevus or confused with innocent conditions such as granuloma pyogenicum. Kaposis sarcoma must be differentiated from syphilis, leprosy, tuberculosis, melanosis, and other affections.

Treatment. X-ray treatment is the method of choice for the Kaposi sarcoma and lymphosarcoma. For the others we prefer surgery combined, at times, with x-rays, or radium.

Diagnosis

While a diagnosis of the conditions we have outlined can be usually made with considerable certainty by an experienced dermatologist, the only way to be absolutely certain is to make a microscopical examination. But unless this is done carefully, properly, and thoroughly, the result is likely to be misleading. An example is the flat type of basal-cell epithelioma. Here, it is necessary to make the biopsy at the edge of the lesion and prepare serial sections. Another example is Paget's disease of the nipple. Repeatedly, general pathologists have reported inflammatory tissue, after which a careful study of serial sections, not only of the skin, but of the nipple and underlying glandular structures, has revealed Paget's cancer. Still another example is the hyperplasia at the edge of indolent ulcers. Cicatrical tissue in a lesion may mask the malignant cells unless the proper spot is selected for the biopsy and serial sections are examined. Not infrequently the biopsy excision is not sufficiently deep. In addition to establishing a diagnosis, a microscopical examination reveals the grade of malignancy based on study of the cell, adds information relative to the important subject of tumor bed, demonstrates whether or not the lesion has become invasive, and gives some idea of whether or not metastasis has taken place. In case the entire lesion is excised, serial sections may show whether or not every malignant cell has been removed. For all these reasons it is advisable to perform a biopsy in as many cases as possible before selecting and instituting treatment and before adding the case to our statistical studies. The consensus today among cancer experts is, that a biopsy is without danger provided it is done with sharp instruments and without massage or squeezing. The piece of tissue can be removed with the cutting current, the coagulation caused by this may lessen the possibility of metastasis, but unless it is properly performed it is likely seriously to interfere with the microscopical examination, except when the piece of tissue removed is of considerable size.

General Discussion of Therapy

In selected material it is possible to obtain excellent results with any one of the established therapeutic methods. There is no best method of treating unselected cases of cutaneous cancer. The trend today, a trend that is to be applauded, is for the cancer expert and for the physician who treats cases of cancer frequently, to be equally experienced and efficient with all the established therapeutic methods. This ability added to adequate clinical and histological knowledge of cutaneous cancer, provides a comprehensiveness that permits superior selection of method or combination of methods for the given case.

The well established therapeutic methods consist of scalpel surgery (including plastic surgery), surgical diathermy, and radiation. The last comprises x-rays and radium. Surgical diathermy is divided into electrodesiccation, electrocoagulation, and electrotomy, each of which requires some form of anesthesia for their effective application to cutaneous cancer. Chemical caustics and the cautery are occasionally useful for selected cases, either alone or combined with other procedures, but they cannot be called thoroughly established methods. Surgical diathermy requires, for its proper application, a knowledge of and training in the principles of surgery. The same applies to the use of radon implants and radium element needles. Selection of the best method or combination of methods for a given case requires discriminating judgment based on the following features: Clinical and histological characteristics, grade of malignancy, character of the tumor bed, radiosensitivity, invasiveness, metastasis, age of patient, location and parts involved.

Limitation of time prevents us from discussing statistics, advantages and disadvantages, indications and contraindications of each therapeutic method, and of technical questions.

References

1. Death Rates from Cancer in the United States Registration Area. Statistics exhibited by the New York City Cancer Committee at the New York Academy of Medicine, Oct. 1932.
2. Ewing, James: Neoplastic Diseases, Philadelphia, W. B. Saunders Co., 1928.
3. Hazen, Henry H.: Skin Cancer, St. Louis, C. V. Mosby Co., 1916.
4. Montgomery, Hamilton: Basal Squamous Cell Epithelioma, Arch. Dermat. & Syph. **18**:50 (July) 1928.
5. Paget: St. Batholomew's Hosp. Rep., 1874.
6. Bowen, J. T.: Precancerous Dermatoses, J. Cut. Dis. **30**:241, 1912.
7. Tieche, M.: Über benigne Melanome, etc., Virchow's Arch. f. pathol. Anat. u. Physiol. **184**, 1906.
8. MacKee, George M.: X-rays and Radium in the Treatment of Diseases of the Skin, Philadelphia, Lea and Febiger, 1927.

PHYSICAL THERAPY IN CHRONIC DISEASES *

(With Special Reference to Peripheral Vascular Disease and Ulcerations.)

DR. I. M. LEAVY

Montefiore Hospital

NEW YORK

The number of chronic diseases for which physical therapy is indicated is so large that we are restricted to a general application of the newer therapeutic methods which have been recently developed. It is therefore reasonable to assume that a complete physical therapy service is essential to any contingencies arising in connection with many chronic affections.

Though therapeutic results in the chronically ill are the most difficult to obtain because of their protracted ailments, we have in physical therapy the means of securing a variable degree of alleviation, improvement, and partial restitution.

An average of 96 separate and distinct diseases is referred to our physical therapy department annually. It therefore becomes too great a task to discuss each one of the chronic diseases or to describe the therapeutic measures with their technic.

Special forms of physical therapy and exceptional modalities other than those here mentioned may undoubtedly prove equally efficient, but the importance lies in the final results. In order to include as many of the chronic diseases as possible, we will consider the various agents and the common chronic diseases for which they are indicated.

The earliest, most prevalent, reliable, and least contraindicated are the triple combination of heat, massage and exercise. They have the advantage of usually being free of all hazard and contraindications when properly administered.

Heat is indicated as a local expedient to the articular or periarticular diseases: neuritis, myositis, muscular spasm or contractures. The more general body exposures to heat are preferable in multiple arthritis, renal disease (for diaphoresis), neuroses, and many of the cerebro-spinal diseases, particularly those involving the pyramidal tracts.

Heat should precede massage and therapeutic exercises as it will enhance these latter measures by inducing relaxation, sedation, and increase of the blood supply. Careful consideration must be given to patients with sensory disturbances. Thermotherapy is extremely varied, but the importance in the choice of heat lies in the proper understanding of the method and the nature of a given disease.

Water, Massage and Exercise

Hydrotherapy is considered by many the most efficient means in certain diseases, irrespective of modern progress in such electrical equipment as dry air heaters, diathermy, and short wave therapy. Tepid baths 85 to 95 degrees F. are often effective in neuroses, myocarditis, and nephritis, and aid in the restitution of extremities following cerebro-spinal cord neoplasms, multiple sclerosis, and other spastic and flaccid paralyses and paraplegias. Often improvement may be obtained in compensated chronic cardio-valvular disease, which may be administered with CO_2 or modified Nauheim baths.

Hot baths, 95 to 110 degrees F. are especially indicated in chronic diseases of bones, joints, and muscles, and are particularly well tolerated by patients with chronic multiple arthritis, either of the proliferative or the degenerative type. It affords greater mobility and comfort to the affected joints, reducing spasticity and inhibiting the development of contractures. Similar results, with diminution of pain and crises, may be obtained by the use of these baths in cerebro-spinal luetic manifestations. The bath treatments have the distinct advantage that they may be given often equally as well at home as in an institution.

The Scotch douche, with its alternate flush of hot and cold water under pressure, proves excellent for neurasthenia and psychoneuroses.

Whirlpool baths are a simple and valuable method of hydromassage for the local treat-

* Read at the December, 1934, meeting of the New York Physical Therapy Society.

ment of the upper or lower extremities for peripheral neuritis, ulcerations, vasomotor and sensory changes in spinal cord diseases, arthritis of smaller joints, post-amputation stumps, mild peripheral vascular diseases, and suppurating wounds of the extremities.

Sitz baths at 95 to 100 degrees F. give sedative effects in chronic conditions involving the genitals, lower pelvis, and rectum.

Massage has an important rôle in chronic diseases, but its best therapeutic results are obtained slowly and repeatedly over a long period of time. Its purpose is to maintain, improve, and correct errors in physiologic functions of soft tissues. In many diseases of the cerebro-spinal cord, peripheral nerves, and joints causing spasticity and contractures, these may be alleviated or eliminated by the right form of effleurage, producing sedation and relaxation.

In more marked contractures and arthritis the deeper and stronger petrissage is indicated. Massage is an excellent adjuvant in edema of the extremities due to renal or cardiac diseases and vaso-motor disturbances. Here effleurage and petrissage may be applied to empty the water-logged superficial and deeper tissues.

Massage is contraindicated in local phlebitis, thrombosis, chronic ulcerative colitis, and in purulent infections, such as osteomyelitis.

Since many of the patients with chronic diseases become sedentary, massage substitutes the activity to which they were accustomed and prepares them for the therapeutic exercises to follow.

Therapeutic exercises should be preceded by thermotherapy and massage and are usually given in the order of passive, assistive, resistive, and active exercises. The early movements of these exercises should be performed by and with the aid of an attendant, with the patient recumbent, in or out of the bath.

This will prepare muscles, articular and peri-articular tissues for future voluntary activity, increasing their mobility, preventing contractures and counteracting deformities. These movements, performed as submarine or hydrotherapeutic exercises, have been of inestimable value in anterior poliomyelitis, transverse and encephalomyelitis, and spasticities in diseases of the cord, and arthritis.

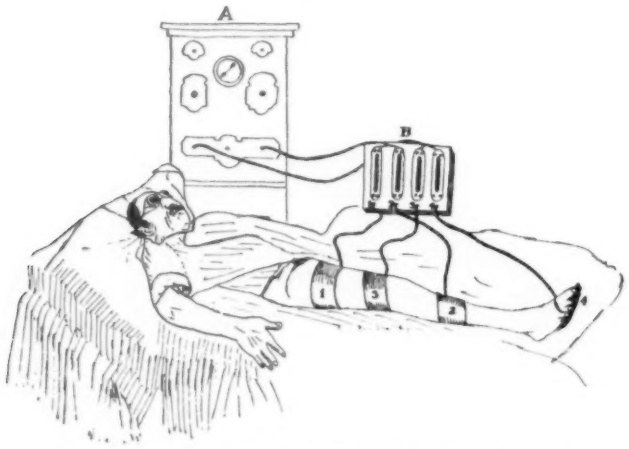

Fig. 1. — Diathermy with multiple (4) electrodes and rheostat control for use in peripheral vascular disease. A. = Diathermy; B. = Rheostat panel; 1, 2, 3, 4, are cuff electrodes connected to rheostat B.

Active and passive exercises are given frequently and for short periods without traumatization; and discomfort following their applications should not last longer than half an hour.

Massage and exercises increase the metabolic rate of patients with chronic diseases, which are usually low in contrast with patients with acute diseases, who usually have a high basal metabolism.

Following active movements in the recumbent or sitting posture, these patients may early be given proper instruction in standing and walking in a walking apparatus or on crutches.

It is necessary to insist on proper exercises for chronically diseased patients, as they tend

to make any form of improper movement that would require the least effort in propulsion. With a complete mechanotherapy equipment patients have the advantage in the use of apparatus which will aid in specific movements, and by acting in groups their efforts and interest become increased.

Reëducational exercises are necessary for developing neuromuscular coordination. Weak muscles should be exercised with relaxation to strong antagonistic contracted muscles, and should never be under a continuous strain, as manifest in wrist and foot drop. Strenuous and prolonged general exercises are to be avoided in overstretched muscles, as these patients become readily exhausted.

Heat

Electric heat is most commonly used because of its convenience and applicability, usually by means of a radiant or luminous lamp, 250 watts, for local use, and approximately 1500 watts for more general application, or portable or cabinet bakers with multiple lamps.

Because of their sedative effect on nerve ends and their penetration of superficial tissues, they have a wide range of application. Local treatments may be given from 15 to 45 minutes in most conditions, affecting small skin areas, muscles, nerves, bones and joints; or an optimal degree of heat continuously, as in peripheral vascular diseases.

Body exposures are available in light cabinets with carbon filament lamps for diseases requiring skin elimination, or with tungsten filaments for their neuro-vascular effects.

The dry air heat bakers have a special indication in the treatment of local parts with extremely high temperatures in patients with chronic arthritides and neuritides, who are free of arteriosclerosis, hypertension or cardiac diseases.

Diathermy presents a very effective agent for the application of heat to the deeper structures. The advance made in this form of therapeutics has increased our facilities for beneficial results in chronic diseases. Included in its many effects are dilatation of vessels, increase of blood and lymph supply, sedation to sensory and motor nerves, relaxation, increase of nutrition and resorption of exudates.

Locally, it is efficacious wherever heat is indicated — arthritides, articular and periarticular diseases of the spinal cord, neuritides, angina pectoris, coronary disease, fibrous ankylosis, synovitis, myositis, peripheral vascular diseases, and ununited fractures. In the form of autocondensation it is palliative in all types of hypertension. The excessive heat of diathermy is not well tolerated in cardiac affections with decompensation, pulmonary diseases, functional neuroses, in many chronic diseases characterized by exacerbations, and by the aged.

Hyperthermy induced by various methods including diathermy (though for the present not used by us) is still inexact and has its disadvantages of indefinite technic of application, discomfort, danger of temperature control and burns.

It is opportune to discuss here the diathermic application of the four or multiple electrodes to patients with peripheral vascular diseases of circulatory, neurogenic, or diabetic origin. This subject is introduced at this time not to replace other tried methods, but as an improvement in the diathermization for this important and progressive group. (Fig. 1.)

One of the usual applications of diathermy electrodes heretofore has been either with plate or cuff electrodes to an area above or below the knee, with one of them placed to the plantar surface. Satisfactory results with this method of application have been wanting due either to insufficient generation of heat throughout the limb, or usually to vascular occlusion extending not only through the vessels of the ankle but through the popliteal and often the middle or more of the femoral vessels.

Increased pain has often followed intense diathermy, which has been explained by some investigators as due to the metabolic rate in the tissues not keeping pace with increased local and general circulation. By the application of suitable electrodes over the course of occluded vessels and with the proper control of resistance of the tissues to the heat at various areas in an extremity, we may exert a relative influence on the structures in accordance with their ability to respond to diathermy.

The four electrodes are applied as follows (see illustration): One cuff approximately 18 by 3 inches, to the mid thigh, a similar size electrode above the knee, an electrode 14 by 3 inches, to the mid-calf, and a plate electrode, about 5 by 5 inches, to the anterior half or more of the plantar surface to the tip of the toes. From the binding posts of the

diathermy apparatus two bifurcated cords are connected to a portable panel containing four high frequency rheostats numbered from one to four consecutively. One of the bifurcated cords connects with rheostats 1 and 2, and the other to 3 and 4. Number 1 rheostat is connected to the mid-thigh cuff electrode, number 2 to the mid-calf cuff electrode, number 3 to the cuff electrode above the knee and number 4 to the plantar plate electrode. This arrangement places each area between the electrodes in a separate defined circuit. Therefore, by increasing the resistance in any one of the rheostats we may limit the extent of resistance to heat to that particular area. It follows that the dense tissue in the lesser area of the ankle requires less current and consequently less heat, as it will not withstand the same degree of heat generated in the larger areas and less dense tissues of the calf and the thigh. This arrangement permits the necessary dilatation and increased blood supply to the part that can be tolerated by it without increased discomfort to other areas. By this means warmth and peripheral circulation is distributed relatively throughout the limb even to the toes. The results have been excellent in many cases, and we hope to present a more detailed discussion at some future time with increased statistical data.

This rheostat arrangement has also the advantage of facilitating the application of diathermy to more than one part or single parts to two patients, as most American apparatus is prepared solely for single applications. The facilities of this method can be increased by adding a milliampere meter so that its cords can be readily adjusted to any of the two posts on the rheostat and thereby afford determination of the amount of milliamperes to each part. An adjustable switch may be added to make it possible to turn on the current in the separate circuits. (With the advent of short wave therapy, modifications of this method can readily be made.)

Low Voltage Currents

Low voltage currents usually in the form of galvanism, faradism, or sinusoidal, have a definite place in the treatment of paralyzed and paretic muscles due to upper or lower neuron disease or trauma.

In this large class of diseases their use is only contraindicated in ulcerations or wounds at the site of application or in pronounced sensory changes. They should be omitted in neuritis with acute exacerbations, myasthenia gravis, and should never be applied over the precordium.

They stimulate the power of contractility and afford neurogenic nutrition to muscles which may or may not undergo atrophy, maintaining the tone of muscles, producing mild heat, and increasing metabolism. They are generally used in combination with other measures and enhance their effect on paraplegias of myelitis, neuritis, peripheral neuro-vascular and vaso-motor diseases, atony of abdominal muscles, and intestinal tract.

Static electricity though limited in use in chronic diseases, is very advantageous in combination with other modalities. Static wave and sparks have a penetrating effect on the deeper tissues of the spine and the lower extremities in tabetics, on the peri-articular tissues of chronic arthritis, or those with fibrous union, also myositis and bursitis. The effluve is sedative in obstinate peripheral neuritis and an important aid for the improvement of phlebitis and varicose ulcers. Static insulation will increase hypotension, so that local static treatments should be avoided in hypertensive cardiacs.

Ultraviolet Radiation

Ultraviolet irradiation is accorded a very important place in our armamentarium, for local and general application. Its field is extensive, and the various wavelengths in its spectrum cause different biological effects.

It influences the blood picture in many chronic diseases by increasing the red and white cells, hemoglobin, and other constituents. In bone dyscrasias it activates vitamine D and increases body calcium and phosphorus, and its application is indicated in all chronic bone and joint diseases.

With general body irradiation over a period of one to three months it is a valuable therapeutic measure in many patients with chronic diseases accompanied by cachexia, inanition, avitaminosis, secondary anemia (especially those with extra-pulmonary tuberculosis). However, general exposures to ultraviolet are not well tolerated by the aged, those with advanced cardiac diseases, severe neuroses, and diabetes mellitus.

Local application by the water cooled Kromayer or cold quartz electrodes prove most effective in many skin diseases, draining sin-

uses, wounds, decubitus, tuberculous and indolent ulcers of the skin and mucous membrane.

For the cutaneous affections our method consists of the application of a 1 to 500 sodium eosine in a 1 to 1000 aqueous merthiolate solution. This is applied to the entire area of ulceration, including its depths and margins, followed with the contact application of a Kromayer or quartz electrode approximately for one minute to obtain the effects of the short wavelength ultraviolet. The commercial merthiolate is reported to be a sodium ethyl mercuri thio salycilate, an organic mercurial bactericide, which is stable, readily soluble in tissue fluids, non-precipitated by serum, non-irritating, non-hemolytic to red blood cells, and of very low toxicity. The properties of eosine and merthiolate are neither affected nor altered by each other.

This preparation has been used on sensitive ulcerations, particularly at the muco-cutaneous border, starting with an eosine 1:5000 merthiolate solution. After the first or second application, tolerance develops for the 1:1000 application. By its potency without alteration in tissues, it perhaps aids in sterilization of ulcerative areas and allows for the penetration and stimulation of the short ultraviolet and eosine fluorescent rays.

Longer waves penetrate more deeply into the tissues, but do not possess the biological effects of shorter waves with lesser penetration. With biotic wavelengths at 2400 to 2600 Angstrom units, some of the deeper biological effects may be due to the fluorescence (or a secondary radiation of longer wavelengths) produced by the absorption of the shorter wavelengths of the ultraviolet and increased fluorescence of the eosine. It has been used as an exclusive treatment with prompt relief from pain, itching or burning, diminution of secretions and rapid formation of healthy granulations.

This treatment has been used with most gratifying results in tuberculous ulcers of the skin and mucous membrane and at the junction of skin and mucous membrane at the nares, mouth, and rectum, large suppurating decubitous ulcers, intractible burns of the hand, x-ray burn of the skin, and severe ulcers in peripheral vascular disease.

In an endemic of ringworm (tinea trichophytosis) in our neurological wards, affecting about 20 patients and involving the perineum, scrotum, and thighs, about six cases were taken as control and this treatment used. The first treatment relieved itching and an average of six treatments removed all evidence of fungus infection.

Conclusions *

Chronic disease presents an important physical therapeutic problem, not only because of its long duration, but also for the tendency to remissions and exacerbations, necessitating prolonged observation and treatment.

Most of the chronic conditions require a combination of two or more modalities at each visit, and these vary with the changes of the pathological conditions.

To obtain better results in chronic diseases we must not only understand the indications for physical therapeutic applications, but also the proper combinations of measures, which account for the better results in private and institutional practice.

* Thanks are due Mr. H. Schulz for the technical arrangement of the high frequency rheostats.

A NEWER CONCEPT OF INFRARED RADIATION IN UPPER RESPIRATORY INFECTIONS *

A. R. HOLLENDER, M.D., F.A.C.S.

CHICAGO

Bier's teaching that hyperemia is nature's reaction to infection, which should be enhanced rather than suppressed, has been substantiated during the past thirty-five years. The favorable clinical results obtained in rhinologic practice by the so-called infrared rays have been explained in Bier's sense — that is, to an active or arterial hyperemia. Of late, however, this concept has been augmented. While acknowledging the rationale of artificially produced hyperemia for the relief of certain acute and subacute infections, the particularly favorable results experienced with infrared treatment can be ascribed to a distinctly chemical reaction. The combination of arterial hyperemia and chemical effect[1] becomes manifest by an enhancement of local metabolism and oxidation as well as increase of drainage, relief of stasis, and bactericidal action.

We know that the longest rays of the visible spectrum are the red, their wavelengths being limited to between 6680 and 6980 A. U. The infrared end of the spectrum has been grouped variously. Lukiesch[2] divides it into *near*, from 7700 to 20000 A. U.; *middle*, 20000 to 500000 A. U., and *extreme* infrared, from 500000 on. Saidman's division of the infrared end of the spectrum is in nine octaves, only three of which have therapeutic significance. The first octave ranges from 7500 to 150000 A. U.. This octave possesses the capacity of deep penetration of body tissues. The second octave extends from 15000 to 30000 A. U., and the third octave from 30000 to 60000 A. U. Glass is transparent to the first two octaves, while fluorite will transmit the rays of the third. The other octaves, extending from 60000 A. U., do not penetrate any known medium.

Troup[3] believes that from the clinician's point of view, the most useful classification of infrared rays would appear to be: (a) those which are of definite value medically, i. e., wavelengths from 7700 to 60000 A. U., but particularly wavelengths of 7700 to 15000 A. U.; (b) those for which there is at present little evidence of therapeutic value, i. e., all wavelengths beyond 60000.

It is claimed by Troup and others that the rays usually continuous with the lower range of the visible spectrum penetrate tissues to a considerable depth. Absorption is less than that of rays of a somewhat longer wavelength, which are taken up by the layers near the skin, owing to the strong absorption of water for this type of radiation.

Chemical Reaction of Infrared Radiation

It is axiomatic in biology that most chemical compounds appear in an optically active form, the only exception probably being dextrose. Optically active compounds are either levorotatory, dextrorotatory, or a combination of the two. Optically active compounds, furthermore, are racemized by heat. Numerous experiments have demonstrated that optically inactive or racemic forms of biologic compounds are lessened in toxicity as compared with the optically active forms.

Certain compounds when optically active have been shown to produce contractions of unstriped muscle, while various workers have found a distinct relation of certain anaphylactic reactions to optically active chemical compounds. These chemical processes play an important rôle in certain acute and subacute infections, especially the more common ones of the upper respiratory tract.

That we are not dealing here with a mere hypothesis is easily seen from experiments[4] with nicotin and histamine hydrochlorid. If a solution of levorotatory nicotin is boiled for a comparatively short time, it loses its levorotation, becomes racemized, and thereby diminished in toxicity. It is well known that very dilute solutions of histamine when optically active, produce contraction of unstriped muscle, a fact which has been confirmed repeatedly by physiologists. If the same solution of histamine hydrochlorid be subjected to the heating influence of infrared rays, it will be-

* Read at the meeting of the Mid-western Section, American Congress of Physical Therapy, Indianapolis, March 13, 1933.

come racemized and lose part of its capacity to contract muscle.

By simple analogy, it will be readily appreciated that apart from the thermic effects, infrared radiation produces a chemical reactivity,[5] manifesting itself biologically by a favorable influence on the course of inflammation.

Prolonged Infrared Radiation

When radiant heat or luminous ray lamps were utilized on a large scale for heat action, it was recognized that such convective heating was clinically superior to the commoner conductive sources. In reality, however, especially with superficial application, radiant heat lamps produce convective and conversive heat, a fact which has been proven by numerous experiments. It is evident, therefore, that the primary action sought for was heat and little was thought of other possible effects.

The directions which were followed were stereotyped under the influence of unreliable claims. There was no definite standard of dosage. Authors gave their clinical experiences and arbitrary time periods for radiation, and, in many instances, relief of symptoms was observed regardless of dosage. There has been advanced, furthermore, only scant evidence that the luminous rays, aside from their heating effect, have any therapeutic significance. It is fairly well agreed, however, that these rays have the capacity of superficial tissue penetration.

Since the infrared generator has largely replaced the incandescent light for therapeutic purposes, it was incorrectly assumed that the effect produced was due to a hyperemia by convective heating. There is no doubt that a superficial warming of tissues irradiated by an infrared generator takes place, but the question arises whether this local action is the only one that results from the radiation. It is fully appreciated that an intense local application produces a more vigorous hyperemia than a milder radiation. It is logical to assume that the degree of intensity of radiation is in a large measure also dependent on the time factor. It has been observed that when a part is exposed to infrared at short range, tolerance of the individual is comparatively small and retention of the hyperemic effect is of short duration. In contrast to this, infrared radiation of a part at a distance permitting prolonged raying with comfortable tolerance, creates a localized hyperemia which is retained for a considerable period. It is this retention of hyperemia which may have some significance in influencing the chemical reactivity suggested as the newer concept of the action of infrared radiation.

Clinically, the effects of prolonged infrared radiation have been productive of improved results in the treatment of acute upper respiratory infections.[6] Patients with head colds have had their heads and faces exposed to infrared for periods varying from ten to ninety minutes, and those subjected to longer radiation showed a more pronounced relief of symptoms. This was particularly true when cooling was not suddenly induced by outside exposure. Another factor which seems to influence the good effects of prolonged radiation is its frequency of application. A patient with a head cold, who is confined indoors and enabled to take three or four treatments a day, will show a more prompt response. As an abortive measure of acute rhinitis, prolonged radiation has been found highly efficacious. It should be emphasized, however, that this measure is not advanced as a specific or a cure-all for every type of upper respiratory disease. It is obviously only an aid to other measures, local or general, which are indicated.

The analgesic and palliative properties of infrared radiation in all forms of upper respiratory disease, and especially in acute nasal sinusitis,[7] were borne out repeatedly by patients unable to secure relief of symptoms from other commonly employed treatment.

Apparatus and Technic

The lamp which, in my hands, has given the best clinical results is one housing a generator which emits a combination of luminous and infrared rays. Such a generator possesses the superficial penetrative properties of a luminous ray lamp and in addition the infrared characteristics.

This type of lamp heats up promptly and generates a reasonably uniform warmth which is well tolerated by the patient from a good distance for a prolonged period. If the heat becomes unbearable, the distance between the lamp and the patient must be increased to allow prolonged radiation. There is no fixed rule, but a good distance to begin with is approximately twenty-four inches to be increased

or decreased as the comfort tolerance of the individual indicates.

The patient is best treated in a reclining position. The reason is obvious when one considers that an hour or more is necessary for an intensive treatment. Protection of the eyes is a point which is always raised. There is no positive proof that infrared rays have a harmful effect on the human eye, but such a hazard may exist, and precautionary measures are therefore advisable.

Conclusions

1. Recent observations and experience render plausible the assumption that the beneficial effects of infrared radiation are attributable to a chemical reactivity rather than a local hyperemia.

2. Prolonged infrared radiation as a therapeutic aid has produced improved clinical results in the acute head cold and in acute nasal sinusitis.

30 North Michigan Ave.

References

1. Hollender, A. R., and Cottle, M. H.: Physical Therapy in Diseases of the Eye, Ear, Nose and Throat, New York, Macmillan Company, 1926.

2. Lukiesch, M.: Ultraviolet Radiation, New York, D. Van Nostrand Company, 1922.

3. Troup W. Annandale: Therapeutic Uses of Infrared Rays, London, The Actinic Press, Limited, 1933.

4. Pacini, A. J., and McGuigan, Hugh: Detoxification of Nicotine by Ultraviolet Rays, J. Pharm. & Exp. Therap. **39**:241 (June) 1930.

5. Pacini, A. J., and Crosley, R. W.: Studies in Photochemistry: The Halphen Reaction, Clin. Med. & Surg. **35**:403 (June) 1928.
———: The Shear Test Applied to Maise Oil, Clin. Med. & Surg. **36**:34 (Jan.) 1929.

6. Vaile, T. R.: Accessory Sinus Disease in Children, Canadian M. J. **22**:198 (Feb.) 1930.

7. Hollender, A. R.: Conservative Treatment of Nasal Sinusitis: Evaluation of Physical Aids and a Newer Concept of Infrared Radiation, M. J. & Rec. **137**:147 (Feb. 15) 1933.

$10,000,000 for Improving Health of the Nation

Investigations of health problems that vitally affect the lives of millions of Americans are needed in the immediate future, and there will be plenty of work for the approximately $2,000,000 research portion of the $10,000,000 health funds provided in the administration's economic security bill before Congress.

Pressing problems are awaiting solution and disease fighters of the U. S. Public Health Service and the National Institute of Health are eager to extend and push forward their fundamental research.

Half a million men working at stone and granite cutting and similar "dusty" trades are victims or potential victims of silicosis, a lung disease that is serious in itself and more serious because it predisposes to tuberculosis. How can these men and other industrial workers be protected from the hazards of their trades?

Streams and lakes on which whole population groups depend for their drinking water are so badly polluted by industrial wastes that they are unfit for use. How can these waters be reclaimed and made safe and others saved from this fate?

Can the threatening spread across the nation of Rocky Mountain spotted fever and typhus fever be stopped before these diseases grow to the proportions of the old-time plagues that spread devastation throughout the land?

It is easy, too, to see where the other $8,000,000 can be wisely spent in measures to protect the national health. It is no secret that city, county and state health departments have been badly crippled in their vital services because of depression budget cuts. On the average, personnel and budgets for these local and state health services have been reduced about 20 per cent, the American Health Association estimates.

The U. S. Public Health Service has already been given $1,000,000 from emergency funds to help out in this situation.

"But something more than these sporadic and temporary measures is needed to provide effective, well planned and conscientiously executed full-time health supervision," the *American Journal of Public Health* (January) points out.

"Obviously, public health service along lines now generally accepted and known to be effective, if extended to reach a large majority of the population, would make a real contribution toward economic security through minimizing the tremendous annual loss from preventable diseases which now amounts to hundreds of millions of dollars."

With $8,000,000 the federal health service can give much-needed aid to local health departments in their fight on malaria, venereal and other preventable diseases and in their efforts to provide public health nursing for state, city and county health authorities; and can help these officials to get more accurate and prompt reports of new cases of communicable diseases, so that outbreaks of smallpox, scarlet fever or meningitis, for example, can be checked at their start.—*Science News Letter*, February 9, 1935.

THE PHYSIOLOGICAL BASIS OF WET DRESSINGS

HEINRICH F. WOLF, M.D.

Consultant, Department of Physical Therapy, Mount Sinai Hospital
Director Physical Therapy, Central Neurological Hospital, Welfare Island

NEW YORK

The history of medicine shows that up to recent times medical therapy has developed on purely empirical bases, that is to say, the efficacy of some of the remedies was known long before we had any conception of their physiological action. Thus quinine was used long before anything was known about malaria plasmodia and digitalis prescribed before its physiological action on the muscles of the heart had been discovered, before indeed our present understanding of heart diseases had even been guessed. Likewise this was the case with the therapeutic procedures which form the subject of my discussion tonight — wet dressings. Wet dressings employing water or medicinal solution have been in use for a long time, and various theories have been advanced during the last twenty years to explain their action and effect. To mention only two, Strasser[1] maintains that they act as derivatives, while Hinsdale[2] explains their action by a hyperemic effect.

The shortcomings of these theories are that they do not explain why wet dressings are ineffective in certain groups of cases while working well in other instances where different methods with a much stronger action of the same kind are of no value. Thus a mustard plaster might be effective in a muscle sprain while a wet dressing would not be. On the other hand a wet dressing might relieve pain in an acute infection while heat, which undoubtedly creates a much stronger hyperemia, would aggravate the condition.

The therapeutic value of wet dressings can be explained, I believe, on the basis of some physiological experiments which were recently carried out without any regard to the problem to which I am applying them. The difficulties encountered before their phyisological action could be explained, may have arisen because of wet dressings having been advantageously applied in two groups of pathologic conditions which differ greatly in their pathologic physiology. Wet dressings are often successfully applied in acute inflammatory conditions following injuries or infections, such as cellulitis, phlebitis, and the like, and in internal conditions, such as pneumonia, enteritis, or cholecystitis. It is very unlikely that these two groups so entirely different in their pathology could be affected on the same basis.

In the first group we have to deal with an acute inflammatory infectious process which is accompanied by hyperemia (redness) and swelling (edema). It is obvious that an edema must interfere with the local circulation, and we may well understand that an increase of arterial circulation following the application of local heat will still more interfere with the circulation, increase the edema, and lead to a breakdown of the tissues. Landis[3] has shown that the capillary pressure in the arterial limb in the skin of a finger is normally 32 mm. mercury and 12 mm. in the venous one, and that this pressure rises to 60 mm. and 45 mm., respectively, at a temperature of 42 degrees C. Taking into consideration the findings of Drury and Jones[4] that edema formation is two to five times greater at 42 degrees C. than at 16 degrees C.—we can well understand that strong heat applications will have a very bad effect on the local circulation as a whole and therefore on the local process.

Starr[5] on the strength of these findings has recommended the use of temperatures between 36½ and 37½ degrees C. — in the treatment of gangrene of the foot, and I can corroborate his assertions that by this method even severe cases of gangrene can be cured without resorting to surgical procedures.

It has been shown that the temperature of the skin inside the wet dressings reaches about that height which Starr found to be of the greatest benefit. This means that by applying wet dressings in infectious cases we create around the affected part that temperature which constitutes an optimum for circulation and therefore an optimum for a cure. Whether we use aseptic solutions or not, is of minor importance. The use of an astringent, like Burrow's solution, or an aseptic, like the solution of Thiersch, will be of advantage in cases with open wounds, but where such are not

present the active principle lies in the production of an optimum temperature and in the regulation of circulation.

A different problem however exists in that group where the pathological process is located in the internal organs of the body. It is difficult to assume on physiologic grounds that an application of wet dressings to the abdomen could have a decided and marked effect on the circulation in its organs, because they are supplied by arteries originating from different parts of the circulatory system. It is hard to conceive that a bandage to the abdomen could have an effect on the mesenterial arteries. The most plausible explanation of the unquestionably favorable influence of such bandages on these pathological processes might be based on the well known theory of Head zones. We know that pathologic processes in internal organs by way of a reflex arc can produce hyperesthetic areas in those parts of the skin which are supplied by the same segment of the spinal cord as the organ in question. We may be justified in assuming that, just as an irritation in the inner organs can manifest itself in sensory disturbances in the skin, a method reducing these sensory disturbances may have a salutary effect on the inner organs. Heymann and Krebs[6] believe that under the influence of wet dressings the sensory peripheral nerve endings swell, and that by the decrease of innervation stimuli a relaxation is produced which proceeds from the periphery to the center. If this physiologic mechanism were true, we could not only find therein a corroboration of the theory expressed above, but we could likewise understand why wet dressings applied to the whole body in the form of wet packs induce sleep and are so quietening in maniacal states.

Such wet packs have likewise been found to be very beneficial in the treatment of acute muscular rheumatism and in infectious arthritis which manifests itself in periarticular swellings. The action in these cases must be explained in the same way as that mentioned under treatment of local infectious conditions. We must not be surprised if such different pathologic conditions as acute articular rheumatism and maniac excitability yield to the same procedure. This will no longer seem strange if we cease joining a given treatment to a certain diagnosis but apply it on physiologic bases. In acute inflammatory rheumatism, periarticular swelling or edema develops and the wet pack, which is after all only a general wet dressing, has a beneficial influence on the local circulation in the affected parts. In chorea, which many authors connect with acute articular rheumatism, this pack fulfills both indications; that is, the relaxing influence on the nervous system and the favorable effect on the rheumatic affection.

The treatment of these forms of rheumatism by wet packs has been practiced on my suggestion for quite some time at Mt. Sinai Hospital with remarkable success. At present I have a case under treatment which showed marked improvement from the first day. Whether the course of the disease can be hastened and the duration shortened can be determined only by observation of many cases with proper controls.

Conclusions

Wet dressings exert their action by:

1. Creating a temperature within the dressing which is optimal for this circulation.
2. Reducing the sensory impulses from the periphery and thus reducing the irritation of the internal organs.

114 East 54th Street.

References

1. Strasser, A.: Handbuch der klinischen Hydrotherapie. Leipzig and Vienna, Urban und Schwarzenberg, 1920, p. 120.
2. Hinsdale, G.: Hydrotherapy, Philadelphia, W. B. Saunders Co., 1910, p. 344.
3. Landis, E. M.: Capillary Blood Pressure, Heart, **15**:209, 1930.
4. Drury, A. N., and Jones, N. W.: Observations Upon the Rate at Which Edema Forms When the Veins of the Human Limb are Congested, Heart, **14**:55, 1937.
5. Starr, J.: Thermoregulated Foot Cradle for Treatment of Peripheral Vascular Diseases, Proc. Soc. Ex. Biol. & Med. **29**:166, 1931.
6. Heymann and Krebs, quoted in Winternitz Hydrotherapy, 2nd edition. Leipzig and Vienna Urban und Schwarzenberg, 1890, **1**:361.

PREVENTION OF RHEUMATISM *

C. G. A. BIORKMAN, M.D.

NEW YORK

Pemberton and Osgood in their excellent monograph on chronic arthritis call our attention to the antiquity of this disease. Prehistoric man has left unmistakable testimony to this fact in the bony remains. The earliest medical observations which have come down to us, deal with the treatment of rheumatic disease and, curiously enough, modern therapy of this ancient malady is based upon the same premises our caveman colleague proceeded from, namely, rest, heat and massage.

It was natural that primitive man's first concern for his physical assets should center itself about his locomotor apparatus, the integrity of which meant life or death in his struggle against an ever hostile environment. While today loss of adequate locomotion is no longer a matter of life and death, its limitation is of greater economic and social importance than it was in antiquity.

Should statistics of rheumatic diseases for the United States be compiled, they would certainly give us serious food for thought. When we consider that a survey by the U. S. Public Health Service of an eastern small town revealed rheumatism to be 35 per cent more frequent than heart disease as a cause of chronic illness, and that in the state of Massachusetts, Bigelow and Lombard found 138,000 rheumatics out of half a million chronically disabled people, then such figures loom ominously. In the same survey tuberculosis accounts for only 16,000, cancer for even less. Consider also that the average chronic cardiac patient lives rarely more than 10 years while the rheumatic might spend 30 years in a wheel chair. The average inoperable cancer patient seldom survives a year or two, thus the economic loss by rheumatic disease is overwhelming. And well do the nations with compulsory health insurance know it. In Sweden where accurate statistics are a hobby, it is known that 9.1 per cent of all chronic disabilities receiving "pension" are caused by rheumatic disease. Every year 3,000 Swedes are pensioned off because of this crippling disease. In Great Britain nearly one-sixth of the total disability of her people is caused by rheumatic disease, costing two million pounds in sick benefit and an annual loss of three million weeks of work. I am sure that the same appalling statistics could be compiled in any part of the globe, except in the Arctics, where rheumatism among the Eskimos is practically unknown.

The question arises, What are we going to do about it? Evidently contemporary medicine is chiefly occupied with classification of the fully developed cases of rheumatism and its treatment by rest, heat, massage, salicylic acid or kindred drugs. The cures, partial or complete restoration, are not frequent enough to boast about. Little, however, is said about the prophylaxis of rheumatism. Since the entire field of rheumatism and its treatment is more or less obscured by tradition and empiricism I offer some observations on the possibility of prophylactic measures against the ravages of this disease. First, I wish to state that my discussion of this problem does not include rheumatic heart disease nor infectious muscular rheumatism, both of which belong to the realm of bacteriology.

I would like to submit rheumatism as an example of how small and insidious disorders in a muscle or a joint may with irresistible tenacity gradually increase in severity and finally completely wreck a vigorous body and doom it to years of invalidism.

The definition of rheumatism as found in any medical dictionary is: "A constitutional disease characterized by pain in the joints and muscles, tending to recur and associated with *exposure to cold and wet.*"

This definition is all-embracing and from its premises it is possible to follow this protean disease from a very small beginning through its subsequent stages so ably studied by a host of investigators from Hippocrates to Pemberton and Osgood.

However, the etiologic value of cold has been referred to in the vast literature on rheumatism only in a general way. I believe that hypothermia is the beginning of this disease which often completely destroys the main bearings of the locomotor apparatus.

* Read at the Thirteenth Annual Session of the American Congress of Physical Therapy, Philadelphia, September 11, 1934.

Arthritis

Rheumatoid arthritis, osteoarthritis and their subsequent degenerative stages, proliferative, climacteric and senile types, myositis or fibrositis are but names for different stages and complications of the same disease which begins with the overlooked and untreated effects of partial or general refrigeration of the body.

There are frankly infectious types of rheumatic disease, the bacterial etiology of which is established, but there is also a majority of rheumatic conditions which can equally frankly be traced to a beginning in a partial or general refrigeration. In fact, one may believe that just this local original exposure to cold prepared the soil for the bacterial invasion. An accidental or frequently repeated exposure to a cold draft may manifest itself merely in a seemingly inconsequential stiffness of a muscle or joint. Vitality with healthy resistance against infection may be sufficient to restore the affected part to normal, and that naturally is the case in the great number of the total. But remembering what actually occurs in a tissue exposed to low temperatures; namely, local anemia followed by hyperemia and exudation of fluid in the tissue spaces, it can readily be seen that in a case of lowered vitality resorption is hindered and fibrinous organization of such exudates takes place. Herein lies, according to my way of thinking, the secret of the rheumatic problem. The various local or systemic manifestations the so-called myositis, fibrositis, myalgia, neuritis, fasciitis and other rheumatoid features have their origin in this local exudation which might justly be called "cold edema."

That this idea of a cold edema is not new or original, the perusal of medical literature will confirm. Like men, ideas also may be forgotten for a time until evidence from scientific research again brings them out in the light of day. The very word rheumatism signified to the ancients a condition of watery flow into the tissues and they connected this phenomenon with cold and dampness. May I be permitted to quote a few lines from one of our modern medical philosophers, William Osler, to show that the idea of refrigeration as a causative factor in rheumatic conditions was not a stranger to his searching spirit. He speaks of neuritis and neuralgia thus: "Localized neuritis arises from *cold*, which is a very frequent cause, as for example, in the facial nerve. This is sometimes known as rheumatic neuritis. Multiple neuritis are cases in which none of the infectious, toxic, metabolic, or cachectic factors prevail, but the disease sets in suddenly after overexertion or *exposure to cold*. In the rheumatic neuritis, subcutaneous fibroid nodules may develop. As for neuralgia exposure to *cold* is a cause in very susceptible persons. Occasionally edema and erythema occurs."

Rheumatoid arthritis, for which a specific etiologic organism is so ardently sought, may be an end result of such a cold edema. Its infectious feature, which later accompanies it, is not to be denied, but the infection may just as well be superimposed on tissues partially devitalized by more or less prolonged exposure to low temperature and disorganized by the resultant exudation. The morphologic changes which take place *in vitro* from generation to generation in the streptococcus viridans and hemolyticus removed from the basal layers of the synovial membranes of the arthritic, speak against their specific etiologic nature. With tissues once devitalized by the refrigatory process, the end products of which have undergone characteristic fibrinous organization, it seems reasonable to assume that they will become breeding places for organisms displaced from their original habitat in the nose, mouth, throat or alimentary tracts.

If we take into consideration that rheumatism and its many consequences are pathologic conditions chiefly met with among people exposed to cold, windy and wet weather and that people living in the balmy tropical or sub-tropical belt of the earth are by no means exempt from this ravaging disease, as seen among workers in the rice fields of Hawaii, irrigation fields of Egypt, and on the veldt in South Africa, it again adds weight to this conception of cold edema as an etiologic factor in rheumatism. Even the casual observer traveling in South America can not fail to notice the enormous number of rheumatic cripples on the streets and in the parks of the beautiful city Buenos Aires where an even balmy climate prevails. The newspapers of that city are crowded with cures for rheumatism. Sudden drop in the temperature accompanied by wind and wet during the rainy season explains the frequent incidence of rheumatism in that country.

It is our duty to prevent, if possible, pathologic fibrous organization in the human locomotor apparatus resultant upon exposure to inclement weather and wind. I venture to

say that massage, judiciously applied, is the only means by which cold edema and its organized by-products can be removed. In some thirty years of observation of this disease, I have never seen or heard of rheumatism among the better situated classes of people in Europe or America, who as a matter of personal hygiene indulge almost daily in massage while the less fortunate classes suffer in a very high degree from this dread disease. I have therefore, come, to the conclusion that massage is a true prophylactic agent against this devastating disease. It is a fact not to be slighted or overlooked, that the popular steam baths and massage of Sweden are important factors in almost completely confining rheumatism to the working classes who, as a rule, use these baths less frequently than others.

I believe more headway could be made by the American Committee for the Control of Rheumatism if propaganda were made for popularizing the Turkish bath and scientific massage as prophylactic measures against this social menace, rheumatism.

Physiologic Action of Massage

The physiologic modus operandi of massage is of a nature that very little of its true action can be verified by laboratory experiments. It is only by clinical observation that we can evaluate this measure. Since the fibrinous organization of exudate sometimes is situated in the trabeculae of lobulated fat pads around or in a joint and most frequently in the fascia, intermuscular septa and anchored to tendinous muscle insertions, it is readily understood that application of massage in rheumatic conditions is not a question of haphazard rubbing, as commonly met with in our public institutions, but emphatically presupposes clinical judgment and palpatory skill coupled with accurate anatomic knowledge. It is deplorable that the teaching of massage in America is largely left in the hands of medically and clinically uneducated lay-people. A case of the blind leading the blind. Yet this congress has under consideration an educational program for physical therapy technicians in which massage is relegated to a minor position. If rheumatism is to be successfully combated, massage must occupy an important place in the training schedule of our technicians. The exhibition of electrotherapy is for physicians only. Massage is the main job for a technician in physical therapy.

The most important part of massage technic is petrissage or muscle kneading. This is done by exerting intermittent pressure on the soft tissues either by pressing a muscular mass against the underlying bony structure or by squeezing it between the operator's fingers. Through such procedure it is possible to produce changes in the muscle which will promote the absorption process as well as the resorption rate of abnormal fatigue products and of pathologic fibrinous or calcareous accumulations. But when we have diagnosed by palpation the pressure of fibrinous organization in the shape of thin bands anchored to bony prominence or tendinous muscular attachments, it is no longer sufficient to use the classical squeezing movements of petrissage. We must then try to break up these adhesive bands by putting the involved tissues on the stretch. This technic may be called tension massage.

The adhesions and thickenings in the subcutaneous tissue layers are palpable to the trained touch of the masseur. They are caused by partially or wholly organized local edematous exudates producing muscle spasms and pain from nerve pressure. It is quite natural that we find these abnormal organizations in the deeper layers as well. The subcutaneous fat is always involved in these connective tissue organizations and it becomes disarranged into abnormal lobulations through the formation of new trabeculae, giving a peculiar knotty touch to the palpating finger tips. The changed consistency of the subcutaneous tissue which we recognize by vertical palpation does not reveal the real cause of pain and limited motion. It is the adhesions between the intermuscular septa and their anchorage to muscle attachments and tendons that interfere with the natural gliding of the muscular layers against each other, and these can only be palpated by tension parallel with the run of the muscle fibres.

This tension palpation, if carried out by the whole palmar surface of the hand, will quickly reveal any local interference with the natural gliding of the muscle layers. In such localities as the axilla the same result will be obtained by using less palmar surface in contact with the muscles under investigation. The whole muscular mass, as for instance the deltoid or triceps, may have to be lifted up from their bony foundation when one is trying to find deeper situated adhesions or infiltrations. When palpation has revealed localized diminu-

tion in muscular gliding it is up to the masseur to restore the natural gliding quality of the muscle layers through tension massage. This form of massage must be given on a dry skin without any sort of lubrication, after the muscular mass has first been properly prepared by heat, mud bath, elevation, radiathermy, or the like. The ordinary massage executed vertically against the bones in useless for the purpose of removing or breaking up of organized exudates. Since our purpose is not to crush adhesions but to stretch and possibly tear them, the technic as here discussed should produce the smallest amount of additional contusion edema which otherwise is more or less unavoidable in most forms of petrissage. To counteract such contusion edema or subcutaneous hemorrhage, it is necessary to follow up the tension massage with effleurage, so as to disperse all accumulated abnormal fluid. The *sine quo non* for success with this procedure is that an accurate detection of fibrotic bands has been made by painstaking palpation so that the tension massage may be accurately applied to the adhesions and their anchorages and not to the easily palpable and rather harmless fibrositic knots in the subcutaneous tissue or to the nerve exits and nerve trunks.

In some localities it is possible to attain the desired results with tension massage by stretching the entire muscle crosswise to the run of the muscle fibres. For example, the origin of the pectoralis can be pressed upwards against the ribs and the erector spinae muscle can be pressed away from the midline of the body, as commonly used in massage for lumbago.

Massage is a wonderful instrument in the hands of an operator who knows how to play it. It does not matter how long and how flexible fingers a musician has, nor how finely attuned hearing apparatus he possesses. Without knowledge of harmony and the mechanics of his chosen instrument he can not produce music, but only noise. The massge operator is in the same fix. He might possess the best kind of hands, firm, strong, flexible, and he might also have read the world's literature on massage, but without the proper knowledge of anatomic structure and its physiology he is unable to accomplish anything but pain and discomfort. Consider for a moment the problem of an adduction contracture in the shoulder joint. If the operator has no clear mental picture of the muscular engines which produce the many intricate movements in the enarthrodial joint and of the checking ligaments, friction absorbers, and protective structures in and about the joint, it is futile to expect results of his massage. Adhesions, painful or obstructive, may be found in both anterior and posterior axillary walls, in both edges of the deltoid and in the clavicular attachment of the trapezius. All these and many more points must be verified by palpation. Pain in the flexor region of the arm is often caused by organized adhesions around the coracoid process. The costocoracoid membrane itself might be involved. Organized adhesions in the subclavicular fossa often cause an irritating cough. Respiratory spasms caused by organized infiltrations anywhere in the thoracic or abdominal wall may be mistaken for asthma or simulate angina pectoris. It is to be remembered that myologic imbalance must perforce produce articular incongruence. Thus a rheumatic biceps femoris may cause unequal weight bearing in the knee joint and thereby produce a vacant articular spot, and as all empty spaces are abhorred by nature, arthritis may endeavor to fill them up. It is evident that much anatomic knowledge is required for good results in these and many more or less chronic ailments of rheumatic origin. It is therefore not sufficient to hand the rheumatic patient over to a masseur or to the physical therapy department of a hospital with the peremptory order "Bake and Massage." It is not so simple as that. The physician must rehearse the anatomical region with the masseur and make it clear to him what is expected of his treatment.

The tension massage sluggested here does not involve any new technic or any additional difficulties. On the contrary it is apt to simplify massage technic by not using any standard method at all. Accurate anatomical knowledge before exhibiting this modality of physical therapy is the keynote to effectiveness. And in no condition is adequate knowledge more important than in these small myologic disorders that ultimately may develop into rheumatism with all its misery.

May I therefore suggest that heat and massage be earnestly considered as essential agents in the prophylaxis of rheumatism. Any stiffness, pain or limitation of movement of myologic nature immediately treated by proper massage will convince any medical man or woman of the truth of my assertions.

Bibliography

1. Boyd, William: A Text-Book of Pathology: An Introduction to Medicine, Philadelphia, Lea and Febiger, 1932, pp. 199-202.
2. Buckley, C. W.: Some Aspects of Climatology and their Bearing on Rheumatic Disease, Brit. J. Phys. Med. **7**:221 (March) 1933.
3. Llewellyn, L. J., and Jones, A. B.: Proximate or Basal Cause of Rheumatism in Relation to Heat or Temperature Regulation, M. J. and Rec. **137**:401 (May) 1933.
4. Maccallum, W. G.: Textbook of Pathology, 4th Edition, 1928, pp. 358-60.
5. Krehl, W., and Marchand, A.: Die Kalte als Krankheitsursche, Handb. d. Allg. Path. **1**:541, 1908, Berlin.
6. Rippschler, F.: Preglers Beitrage, **28**:541, 1900, Berlin.
7. Mudd, S.: Reactions to Chilling of Body Surfaces, J. M. Research, **40**:53 (May) 1919.
8. Lindskog, K.: Acta Soc. Med. Suec. 1926, 1929, 1930, Svenska Gymnastiken, Dec., 1920, Sept., 1930, May, 1931, Stockholm.
9. Quincke, A.: Rheumatismus, Deutsche med. Wchnschr, **33**, 1917, Berlin.

STASIS OF THE COLON *

JOHN SEVERY HIBBEN, M.D.

PASADENA, CALIF.

Although colonic therapy was known and used as early as 1500 B. C., the medical profession as a body has shown little interest in any manner of its practice. This is doubtless due to improper exploitation by poorly qualified enthusiasts and to unscrupulous commercialism. But even with these handicaps it has survived and is widely used here and abroad, because of good clinical results. It has been said that those who are down on a thing are usually not up on it. This applies to colonic therapy, for many of our leading colleagues after investigation and study have concluded that colonic therapy has a place in our therapeutic armamentarium.

There can be no doubt that as a source of toxicity the colon and the distal end of the small intestine play no small part. Physicians in the past have recognized this fact, but have prescribed indiscriminate purging with cathartics and enemas in keeping with many other thoughtless procedures. One needs only recall the wholesale extirpation of tonsils, teeth, gall bladders, appendices, tubinates, the routine straightening of septums, injection of hemorrhoids, or suspensions of viscera for all kinds of affections to realize this truism.

On the other hand the so-called "Colon Filling Stations" in lay hands are to be condemned, because colonic therapy should be administered under medical supervision. Unfortunately, there are comparatively few medical men who have given the time and study to the subject to be qualified to even direct the treatment. The remedy is obvious.

Every hospital and sanitarium, every medical group, and every physician with an extensive practice should be equipped for colonic therapy. This would take the work out of lay hands and do away with the so-called colonic specialist, who is apt to become one sided and over enthusiastic about this one therapeutic measure.

Definition. Colonic therapy is a method of cleansing and treating the colon by various remedial agents, with the aim of changing its flora, rehabilitating its tonicity, and restoring its physiologic motility.

Indications for colonic therapy are to be considered only after a careful history has been taken, followed by a physical examination. Merely to name diseases and conditions in which it is indicated is meaningless. Many physicians assume that the only indications for colonic therapy are those that are referable to the colon itself, and conclude that one or two so-called normal bowel movements a day eliminate the colon as a source of toxicity, while, as a matter of fact, they are no index of a possible intestinal toxemia. I think that every chronic case should be studied from the standpoint of a possible intestinal toxemia. The indications therefore will depend on the clinical symptoms, study of the intestinal flora,

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which includes gross chemical microscopic examination of stained specimens, cultural methods, and last, but not least, barium enema with x-ray examination.

Methods. To attempt to decribe all the different methods used for colonic irrigation and evaluate each one would be like walking where angels fear to tread. There are many, and each has its advantages and disadvantages. Snyder[1] classifies them as follows:

1. Low irrigation; rectal tube inserted three to four inches.
2. Medium; use of a 54-inch tube, a portion of which reaches just into or beyond the sigmoid.
3. High irrigation; passing of a 54-inch tube or longer to the splenic flexure or to the proximal portion of it.

In general all attempt to cleanse the colon from the cecum to the rectum. The quanity of fluid used is not constant, and varies from four to six pints to five to six gallons. The fluid is varied in amount to suit the particular capacity and comfort of the patient. There seems to be no fixed rule as to the rapidity of injections or the height of containers. The types of tubes used may be of rubber or metal of varying diameter and of various lengths, some with closed, some with rounded, and others with pointed ends, the openings being on one or both sides.

Containers are usually of glass and number one to three. The return flow at the rectum is variously controlled by two or three way valves connected to a rectal tube, or by parallel tubes which are inserted a small distance into the rectum. Some use suction and some external pressure to induce return flow.

Exponents of the short tube claim that fluid passes into the cecum in three minutes, and that the long tube merely coils up in the rectal ampulla or sigmoid. Admitting that a long tube can be passed into the cecum at times, there is no accurate test that the tip of the tube is in the cecum proper, except by roentgen examination. The dangers incident to passing such a long tube should preclude its use.

For the past ten years I have used most every type of colonic irrigating device with varying degrees of success and failure. I discontinued the long tube because of an accident to a patient. I then used the short tube with varying success, but was in constant fear of another accident. I had it again brought forcefully to me that even an enema taken at home by the patient with the bag elevated four or six feet was not without danger on account of the pressure of the column of fluid. This possibility is demonstrated in a patient referred to a roentgenologist. On the last day after the barium enema had been given by him and the radiographs were taken, she was told to go home and take an enema, with the result that the patient had a perforation but recovered after operation and a stormy convalescence. About that time I was ready to abandon colonic therapy when I learned of the following safe method. It was found that the maximum pressure of the fluid in the colon should not exceed one-half pound. One-half pound pressure would be the equivalent of the head pressure developed by a column of water 13½ inches high or approximately one foot elevation above the patient's body. This pressure is indicated by a gauge on the apparatus. By this method the return flow of the fluid may be aided by a slight suction not exceeding two inches of vacuum, which is within physiological limit, and less than one-fourth the amount of suction created by forcibly drawing air into the lungs. The method has proven to be odorless, painless, and safe. The apparatus greatly facilitates restoration of physiologic peristalsis, even in indolent, toxic colons, by positive and negative pressure, which alternately expands and contracts the entire bowel without danger.

This method has not only a stimulating effect upon the musculature, but also a tendency to work free the contents of pockets, diverticula, and old incrustations of mucus. As soon as peristalsis is developed, the treatment is concluded, and the patient is permitted to have a natural evacuation, without the usual exhaustion following prolonged treatment.

This method is also of value in preparing the colon for x-ray diagnosis for the reason that misleading opaque substances are frequently removed. In addition the freeing of the diverticula of their contents, prepares the way for the barium to fill these abnormalities which may otherwise remain obscured.

Short stimulative treatments extended over a period of time are better tolerated by the patient due to the fact that toxins are eliminated with a minimum amount of absorption and without fatigue. Drainage is augmented during the accompanying reëducation of the musculature of the bowel.

Basis of Colonic Therapy

The following quotations taken from con-

tributions by men of authority substantiate the rationale of proper colonic therapy.

The noted anatomist and physiologist, Keith of England, after studying the works of Lane, Metchnikoff, and Barclay Smith, all of whom consider the large intestine an unnecessary cesspool, the products of whose stagnation poison the entire body, says: "If these statements are well founded, medical men are face to face with a condition which threatens the health and survival of modern civilized races."

Alvarez has said: "Why upset twenty-four feet of intestines with a purgative when the material to be removed is in the rectum or sigmoid within easy reach of a little water? . . . Certain experiments have been performed at the Mayo Clinic. Various antiseptic substances were placed in ligatured intestinal loops, without sterilization being obtained in a single case. . . . There seems no doubt that the proved bactericidal action of solutions of such substances when employed in irrigation, is in large measure due to the *mechanical cleansing* of the mucous membrane."

Worster[2] says, "The cecum is an ideal incubator for the streptococcus, and unless the cecum is emptied of its content and the flora changed, the removal of tonsils and teeth are of little value in effecting relief in arthritis. It has been definitely proven by x-ray study that the antiperistaltic action of the colon retains semifluid mass in the cecum for dehydration. Therefore, the only safe method is by applying a mild sustained negative pressure which causes a contraction of the entire bowel length. This phase of colonic therapy has been scientifically developed and clinically proven over a long period of time with the use of the Dierker apparatus."

Summary

The conditions in which colonic therapy have proved beneficial are briefly summarized:

1. Mechanical cleansing of the bowel and for examination of the stool.

2. Treatment of various types of atonic constipation and colitis by reëstablishing muscular tone of the bowel and peristaltic action.

3. As an adjunct in cases of nutritive and metabolic disorders which include a wide variety of chronic ailments.

4. Diseases of the skin and allergic conditions. I have greatly improved many of these affections with no other therapy, and have also found it a valuable adjunct in the treatment of dermatoses.

5. Pre- and post-operative care. Twenty-four hours preceding most of our surgical cases a colonic treatment is given and we find that in most cases the distressing symptoms caused by gas distension are reduced to a minimum. After the patients have left the hospital and on their first visit to the office they are given a series of two or three colonic treatments. It is amazing what amount of undigested food and waste is thus eliminated. Post-operative anorexia is benefited, due to an improvement of the vascular and lymph circulation of the splanchnic vessels and of the parts which have reflex effects on the liver, pancreas, stomach, and the kidneys.

6. Preparation for hyperpyrexia treatments. I have found this method of hydrocolonic therapy of decided value in preparing toxic cases for hyperpyrexia treatments. Six treatments over a period of from two to three weeks suffice. The approximate time of treatment is from twenty to thirty minutes.

7. Solutions. After trying a large variety of medicated solutions I have, except where there are specific indications, as in cases of amebiasis, discontinued all solutions and use only nearly neutral solution at a temperature varying from 98 to 100 degrees F. Likewise I have lost faith in bacillary implants by the colonic route.

When using city tap water it is well to ascertain the pH, because various sections of the country have both acid and alkaline water.

Conclusion

1. Colonic therapy scientifically precribed and administered is one of the most useful adjuncts to our therapeutic armamentarium.

2. The Dierker apparatus is superior and outstanding because it is safe, odorless, cleanses the colon, and stimulates action of the musculature of the bowel within physiological limits. It permits control by a pressure and vacuum indicator.

3. Colonic therapy should be taken out of the hands of quacks and irregulars and placed under the scientific control of qualified physicians.

506 First Trust Building.

References

1. Snyder, R. G., and Fineman, S. A.: Clinical and Roentgenology Study of High Colonic Irrigations as Used in Therapy of Subacute and Chronic Arthritis, Am. Jr. of Roent. & Rad. Therap. 17:27 (Jan.) 1927.

2. Worster, Wm. W.: Pres. So. Calif. School of Phys. Therapy.

THE ARTHRITIDES AND COLON THERAPY *

JACOB GUTMAN, M.D., Phar.D., F.A.C.P.

BROOKLYN, N. Y.

The American Committee for the Control of Rheumatism[1] defines the arthritides as "Generalized diseases with joint manifestations." If we subscribe to this definition we must assume that the various pathological changes observed in arthritis in or about the joints, involving bone, cartilage, tendon, muscle, and synovial membrane, are only local manifestations of a general disorder, and that the actual etiologic factor must be elsewhere in some other part of the organism. Upon such premises it becomes evident that in the successful treatment of arthritis it is imperative to discover if possible, the active cause of the systemic affection. For this reason it is essential to study in each case the whole organism, to make an investigation of all organs, to search diligently for sources of infection and obscure toxic factors which cause injury to joint tissues. Through such examination one may be enabled to establish the etiologic factor in many cases of arthritis and to apply rational therapy.

In this presentation we shall concern ourselves only with one such etiologic factor, the colon, it being one of the greatest sources of potent toxic products. We shall therefore endeavor briefly to point out the connection of abnormal conditions in the colon with the various pathologic changes, infectious and degenerative, observed in arthritis.

The Arthritides

The interest of the medical profession in arthritis has greatly increased in recent years, since it constitutes one of the most troublesome affections of humanity and presents the most important problems the profession has to solve. Arthritis is so prevalent throughout the country and is connected with so much misery and economic loss, that even lay communities have lately taken an active interest in meeting this imposing problem. In Massachusetts alone, for example, Pemberton[2] states there are 150,000 disabled individuals unable to enjoy life or engage in occupations because of arthritis, while in some states the ratio of rheumatic cases to the population is even greater. Much research work is being done correctly to establish the etiologic factors, and much effort is spent to discover remedies which will accomplish, if not a cure, at least an amelioration of symptoms or the checking of the progress of the disease.

The combining by the American Committee for the Control of Rheumatism of the various types of chronic arthritis into two principal groups, has greatly simplified its study and classification. Its division into the *atrophic group*, comprising the proliferating, chronic infectious or rheumatoid arthritis and arthritis deformans, in which only the soft tissues of joints are involved, and the *hypertrophic group*, including the degenerative, metabolic, and osteoarthritis, where the hard tissues are affected, is most appropriate. To complete the classification, the allergic type accompanying serum sickness, the metabolic form found in gout, scurvy, rickets, and the neurogenic arthropathies, as mentioned by Cecil[3], must be added.

Considerable difference in the symptomatology of the two main types of arthritis renders their differential diagnosis also less difficult. The atrophic type occurs in earlier life, from 15 to 40, affects small joints, and is often bilateral and of symmetric distribution; it is frequently accompanied by fever; the limitation of motion and wasting of tissues appear early. The hypertrophic type occurs later in life, after 40, and is asymmetric; here the larger joints are usually involved; the wasting of tissues and dysfunction are less pronounced, and occur much later in the course of the disease.

The micropathology, as shown by Allison and Gormley[4], is also definite and characteristic for each of the two types; the same is true also of their gross pathology. The radiographic appearances present distinguishing characteristics. In the atrophic type a haziness of the interarticular spaces, diminished bone density, destruction of cartilage, apposition of adjoining bones with fusion of articular surfaces is the typical picture. In the hy-

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pertrophic type increased bone density, overgrowth of osseous tissue, spiculation, lipping, degeneration of cartilage without fusion of adjoining bones are the usual findings.

In addition to these characteristics serving to distinguish the two main types of arthritis, there exists also a distinct difference in their etiology. No one may deny the association of certain contributory factors with each type. Such incidences as lowered resistance, fatigue, exposure, wet climate, frequent colds, undernutrition are known to precede the rheumatic type; on the other hand, endocrine imbalance, previous injuries, hereditary and constitutional influences, overweight, faulty posture, diabetes are more commonly associated with the hypertrophic type.

Focal Infection

Intimate association of joint disease and focal infection seems well established and requires no further emphasis. Much indisputable evidence in thousands of instances, has been submitted in the affirmative. Numerous cases of arthritis have been traced directly to infections of the teeth, tonsils, and other organs, and were either improved or cured upon the removal of such foci. Yet the situation is not so simple nor so final, because many a case cleared from all apparent infections has failed to be benefited. Wiltsie[5] states:

> In the past, chronic infection has been too narrowly considered. Obvious foci were removed or drained and the patient was expected to get well. The possibility of obscure or diffuse foci producing symptoms was never seriously considered. Neither was the possibility that there might be constitutional or other conditioning factors influencing chronicity. Independent and unrelated foci may be easily eradicated and the menace removed. But when vicious circles become established we are dealing with a chronic condition not so easily controlled.

Hence, in every chronic resistant case of arthritis, such vicious circles must be searched for and eradicated.

Because the colon is often overlooked as a source of infection in arthritis, the situation is made even more difficult. While the teeth, tonsils, prostate, fallopian tubes and other organs where pyogenic organisms are segregated have been accepted by most clinicians as foci of infection and the origin of disease in distant organs, there are unfortunately, however, still some practitioners who fail to appreciate the colon as such a source, and particularly its connection with the arthritides. To these, the doubtful, we must attempt to point out such connection and elucidate the rationale of colon therapy.

It is our opinion that the atrophic type of arthritis is inflammatory in character; that it is undoubtedly an infection due either to bacterial invasion, bacterial toxins, or allergy. The etiologic factor in the hypertrophic type, on the other hand, seems to be associated with faulty metabolism poisons productive of degenerative processes, rather than with bacterial infection. The observations of Pemberton and co-workers[6] of a lowered basal state, delayed glycogen destruction, decreased superficial tissue circulation, and oxidation with diminished temperature also point in the same direction.

The bacterial issue of arthritis has been given extensive discussion. The experiments of Rosenow[7], Haden, and others are classic, and leave little doubt as to focal infection being the cause of this type of arthritis. Cecil[8] has succeeded in obtaining various bacterial cultures not only from joints and adjoining enlarged glands, but also from the blood stream. In 67.3 per cent of 49 cases of rheumatoid arthritis, hemolytic streptococci were recovered by him from joints, while in 62.3 per cent of a series of 154 cases he obtained positive cultures of streptococcus from the blood; with the blood serum of many of these cases he was able to agglutinate the same streptococcus. A very high percentage of positive agglutinin reactions against the streptococcus now associated with the atrophic type has recently also been obtained by Cox and Hill[9] in a series of 67 cases of arthritis.

Indisputable evidence that the streptococcus, at least, is the microorganism of infectious arthritis is further furnished by Cecil, Nicholls and Stainsby[10], who induced in the rabbit typical rheumatoid arthritis with all its manifestations, acute and chronic, by the intravenous injection of attenuated hemolytic streptococci recovered from rheumatoid cases. Serologic evidence is further submitted by 97 responses of agglutination to their "typical strain" of streptococcus in high dilution in 103 cases of rheumatoid arthritis. Dawson, Olmstead and Boots[11] reported similar agglutinations in 67 instances of 167 typical arthritic cases. Many other investigators described similar experiences. Burbank and Hadjopoulos[40] have developed a technic for bacterial fixation and claim that "A fair percentage of arthritis

patients, especially those suffering from colitis and chronic constipation, have a marked tendency to effect complement fixation in certain strains of nonhemolytic streptococci isolated from the intestinal tract of similar arthritic cases." These observations substantiate the specificity of the streptococcus in infectious arthritis and its agglutination properties in the blood. Besides, there are other laboratory and clinical indications that point quite definitely also to the fact that the atrophic type of arthritis is of infectious origin.

On the other hand, in the degenerative or hypertrophic type, being so unlike the infectious clinically, radiographically and anatomically, different etiologic factors may be suspected to exist. Up to now no bacteriologic background, except perhaps some chemical entities of bacterial origin, could be associated with this type of arthritis. Occurring more frequently during the middle and senile ages, in the obese, the diabetic, and at the menopausal period, faulty metabolism rather than infection suggests itself. Keefer and his associates[12], and Nichols and Richardson[13], from a study of a series of necropsies of such cases, concluded that traumatism associated with motion and weight-bearing and the process of ageing are the causes of primary degenerative changes of joint surfaces in this disease, while the later manifestations and the bony excrescences are the result of an effort of repair of the damage. Burnett and Roberts[14] ascribe the changes to failure of nutritive substances necessary for the construction or preservation of normal bone and cartilage from faulty metabolism in the gastrointestinal tract, and emphasize the necessity of proper anabolic diet and living.

In those cases where joint changes ascribed to degeneration are found associated with changes due to superimposed infection, both etiologic factors are active; these constitute the mixed type described by some observers.

It will be necessary to bear in mind the above mentioned facts regarding the two main types of arthritis when we come to present the colon as a source of bacterial infection in the infectious type, and as the depot for numerous toxic products of bacterial and food origin effecting pathological changes in joints of the degenerative type.

The Colon

The question whether the colon constitutes a focus of infection, as previously stated, is still being debated; indeed, there are practitioners who are inclined to deny the whole theory of focal infections, while others who subscribe to the theory are nevertheless loath to accept the colon as such focus, disregarding the fact that this organ possesses every feature, anatomic, biologic, and chemical, favoring the existence of bacteria and toxic production. It contains a great variety and number of microorganisms, aerobic and anaerobic; most of these, true, are indigenous, but many are definitely pathogenic or assume a pathogenic rôle under certain circumstances. The bowel also presents a large area for absorption, with numerous blood vessels and lymphatics to carry the absorbed material into the general circulation and distant organs. Such absorption is particularly active in the cecum and proximal portion of the colon where the contents are soft and the bacteria and toxins luxurious. It is therefore surprising how one can question the colon being a focus of infection and source of intoxication. If the frequency of intestinal stasis with increased absorption of poisonous products because of deviation of the gut from its normal anatomical structure, its displacements and deformities, its dysfunctions from local and distant causes, are taken into consideration, one must accept the colon as a factor in infections.

We do not wish it to appear here that we fail to give due importance to the other numerous causes of colonic stasis, but we do wish to emphasize the importance and frequency of one cause, colon deformity, which is not always realized. Pemberton many years ago recognized and described: "The unusual conditions of the intestinal tract which are present in the course of chronic arthritis and often precede it. These conditions are especially recognizable in the colon, because there they can be most satisfactorily studied by the x-ray; they consist of elongation, widening, tortuosity and inertia of that organ."

In an earlier communication[16] the author pointed out some serious consequences of abnormal colon posture with dysfunction. Normally the bowel is so built and situated as to fulfill its physiologic functions perfectly; it floats in the abdomen suspended by its mesentery as a guy-rope, to be free to engage in peristaltic motion; the musculature, haustration, sacculation, and the nervous mechanism providing for regular pendulum, peristaltic, and mass movements, assure thorough and

complete digestion of intestinal contents, normal absorption, and periodic discharge of useless or harmful residues. But abnormally, deflections in the course, shape and position of the colon, whether of pathologic or static origin, interfere with such functions and result in disorders. Such abnormalities are not uncommon. Kantor[15], in a series of 668 unselected cases with gastrointestinal symptoms, found 62 of colon redundancy; in 78 cases of colon disorders reported by the author[16], 12 constituted cecum abnormalities with incompetent ileocecal valves, which incompetency is now admitted to be an active contributory cause of intestinal toxicosis. A deficiency of the valve's extrinsic and intrinsic mechanism permits regurgitation of contents from the infective cecum into the clean ileum, with absorption of toxic material. There were, besides in this series 8 cases of abnormal ascending colon, 17 adherent hepatic flexures; the transverse was found ptosed in 22 cases, the splenic reversed or ptosed in twenty per cent; kinked or angulated descending colon was present in 17 cases; the sigmoid was found redundant, reduplicated, displaced, or dilated in 48 instances; the rectal ampulla was atonic and dilated in a number of these cases.

These and other pathologic states, as adhesions, constrictions, ulcerations, diverticulae, polypi, benign and malignant masses are frequently encountered. They greatly interfere with normal intestinal function, producing mechanical stasis with intestinal toxemia and causing elsewhere numerous pathological disturbances, physical and even mental. Cotton[17] found most of the above enumerated pathologic conditions in a great many necropsies of his mental cases. In cases of colectomy he was even able to demonstrate various streptococci and virulent bacilli in the enlarged mesenteric lymph nodes. Fletcher[18], and Pemberton found colonic stasis due to bacterial products to be very common.

It is evident that such abnormal anatomic states as mentioned above must affect the colon's several functions and be followed by some general disturbance. Absorption, one of the functions of the intestines, may be influenced; the cecum, heading the large intestine, like the bulbus duodeni of the small intestine, serves as a reception chamber for the soft or mushy ileal contents. Here absorption and various chemical and biologic changes take place most actively. If the cecum or proximal colon are abnormal, the absorption of the considerable fluid poured into it from the small intestine, the various salts, biliary constituents, gases, and other products formed during the process of digestion, may be delayed. On the other hand, destruction of the epithelial mucosa here or anywhere in the colon, with denudation and erosion of large areas may hasten absorption. Such absorption is unfortunately not confined to normal products, but includes also abnormal substances in the gut, derived from faulty metabolism of proteins, carbohydrates and fats. Some of these, as will be seen later, are quite potent and deleterious, causing when absorbed numerous constitutional disturbances and affecting various organs including the joints.

Elimination is another important function, the bowel being one of the three principal channels through which it is accomplished. With the feces are expelled a variety of substances, innocuous or quite toxic: the remaining secretions as erepsin, invertase, amylase, the unabsorbed by-products of proteins and nucleoproteins, fat derivatives, food remnants, cellulose, keratin, elastic fibre, as well as ingested heavy metals like bismuth, lead, calcium, and magnesium. Abnormalities in the colon play a most important rôle in the interference with this function of elimination, constituting the most frequent cause of intestinal stasis with its resulting autointoxication.

Intestinal Bacteria

To the more toxic substances demanding elimination, however, to the bacteria and their by-products, must be accorded first importance, as their retention in the organism will affect the general health and cause various symptoms. Bacteria are found principally in the large bowel, as the stomach and small intestine are practically bacteria-free, or at most contain merely the liquefying types. Most of the microorganisms in the normal bowel belong to the coli group, the other types constituting but a small percentage. They represent about 50 species and varieties, including Gram positive and Gram negative saprophytes, and the pyogenic streptococcus and staphylococcus.

Microorganisms reach the colon apparently without difficulty. They pass the barrier of stomach acidity and enter the proximal intestinal tract where absorption is greatest, from where they may invade, through lymphatics and blood vessels, the general circulation and distant organs, including the joints.

This is the usual route of bacterial invasion, though Redewill, Potter and Garrison[19] speak of a reverse current, the streptococcus migrating from the colon to the teeth and tonsils. Of the bacillus coli, Bassler[20] states only about 4 types are definitely pathogenic. Other organisms known to be associated with disease are the bacillus typhosus, paratyphosus A and B, bacillus Flexner and Shiga, the bacillus dysenteriae, bacillus bulgaricus, proteus, bifidus, putrificus, aerogenes capsulatus, botulinus, pyocyaneus, butyricus, the streptococcus, staphylococcus and Gram positive cocci and diplococci. Crowe[21] isolated a "micrococcus deformans," presumably the cause of infectious arthritis. Of the various toxins formed in the intestines the dead bodies of microorganisms, their discharged ectotoxins and the disintegration products of foodstuffs by microorganisms should be mentioned.

Intestinal Toxicosis

The bacterial flora of the colon assumes a very important rôle in each case of atrophic arthritis. The streptococcus viridans, less frequently the hemolyticus, was found by Traut and Herrold[22] on the rectal mucosa of arthritics more commonly than on those of controls. They used a particular method of culturing especially favorable for the demonstration of the streptococcus and staphylococcus. The streptococci obtained were similar in their characteristics to those in the mouth and the teeth. In a series of 60 arthritis cases they found that 44 also suffered from some colon disorder, like constipation, irritable bowel, spastic fermentative colitis. The streptococcus viridans of certain cultural characteristics and habits they recovered in 43, the hemolyticus in 7 cases, with the gradual reduction in the number of bacteria accomplished through special diet and therapy, while the arthritics who were treated also showed a general improvement. In another communication Traut[23] reports improvement by non-specific measures and vaccine therapy of a great percentage of cases where agglutination by the serum of the host and cross agglutination of other rectal strains was present.

In discussing the modus operandi of systemic infection, Synnot[24] believes the actual course of chronic intestinal toxemia to be as follows:

> A bacterial infection starts in the teeth, gums, sinuses, tonsils or bronchial tree; as a result of swallowed infectious material secondary pathology develops in the stomach causing hyperchlorhydria, infective gastritis, peptic ulcer, or infective achylia gastrica; later, as a natural sequel an infectious duodenitis, or gall tract disease with chronic biliary stasis, masked cholecystitis — often cholelithiasis — may develop; and finally, in a large percentage of toxic products, diversification of clinical symptoms and varying degrees of colon pathology.
>
> The end results of such a chronic infection, unless it is checked by proper treatment, are secondary involvement of the joints, the nervous, cardio-circulatory and renal systems, such as arthritis, rheumatism, heart disease, endarteritis, nephritis, diabetes, secondary anemia, neurasthenia, septic psychosis and occasionally insanity. . . . As a result of the invasion of the alimentary canal by pathogenic bacteria, virulent toxins are produced. The mucosa is irritated by the toxins or invaded by the microorganisms themselves. Absorption takes place through the lymphatics and capillaries. The bacterial poisons eventually act on the nerve supply of the abdominal organs, causing spastic colitis, or contributing to the production of atony and atrophy of the muscular coat of the bowel with delayed motility, constipation and stasis. The ileocecal valve soon ceases to function normally and ileal stasis follows.

Toxic Food Products

Next to the bacteria and their toxins, poisonous food products play an important rôle in joint affections. Incompletely digested food and unutilized digestive juices are subject to decomposition by the myriads of bacteria dominating the intestines, from pylorus to anus; this results in the production of a large number of more or less toxic compounds, some of which are definitely detrimental to the organism. Many of these have been shown to have a decided connection with the degenerative changes in the arteries, muscles, nervous system as well as articular tissues. They are by-products from the incomplete digestion of proteins, carbohydrates and fats. From carbohydrates various fermentation products and acids, as oxalic, formic, acetic, propionic, lactic, butyric, oxybutyric, and succinic and higher alcohols are formed, which, if not reduced to their minimum end products like methane constituting about 40 to 50 per cent of the gases formed in the intestine, are not any too beneficial to the organism. They cause upon absorption definite disturbances somewhere in the system.

From the incomplete digestion of proteins, because of imperfect gastric and pancreatic function or bacterial action, numerous amins and diamins, some known to be poisonous even in minute dosages, are formed. Barger and Dale have isolated beta-imidazolylethylamin

identical with histamin, a very potent substance known to cause lowering of blood pressure, bronchial spasm, salivation and other disturbing symptoms. They also obtained tyrosin, a similarly violent product. Eppinger and Gutman[25] demonstrated in various gastrointestinal disorders the presence in the intestinal mucosa and stools of histidin, tyrosin, putrescin, cadaverin, and other similar products. Baumann and Udransky and Roos also isolated cadaverin and putrescin in intestinal contents. Other investigators here and abroad have recovered similar poisonous products from the intestines.

Peptones and proteoses where formed may in ulcerative conditions of the bowel enter the general circulation and cause allergy or other serious symptoms. Basic ptomaines, like ethylenediamin, trimethyldiamin and other amino-acid bases originating through the action of anaerobic microorganisms, likewise phenylethylamin, indolethylamin, indol, scatol, phenol, cresol, tyramin and various gases, under certain circumstances become asborbed and injure the organism. Fatty by-products, as lechithin, cholin, neurin, muscarin, and biliary derivatives like cholalic acid, bilicyanin, bilihumin, are of similar potency and equally injurious. The uric acid group, products of hydrolysis of the nucleic acid radicle adenin, guanin, xanthin, hypoxanthin, uric acid, are definitely associated with the etiology of gout and other purin-base manifestations, and may be mentioned here among the by-products of metabolism detrimental to the organism.

Were it not for the natural protective agencies of the body, local and systemic, the consequences to the organism from absorption of the above toxic products would be very serious; but many of the formed poisonous products are in some manner made harmless, either detoxicated, or conjugated in the liver or broken down into the simplest substances to be eliminated. Nevertheless many are absorbed, especially in a pathologic colon, and produce their toxic effects in the arterial system, the muscular apparatus, the neural system, causing changes of a degenerative character. It is quite safe to assume, even if not yet fully proven, that some of these poisonous substances affect the delicate and poorly nourished articular tissues of joints, and cause the degenerative changes seen in the hypertrophic type of arthritis. That purin derivatives cause joint manifestations is certain, and it seems just as certain that other toxic products of metabolism, equally potent or even more so, are apt to attack the joint tissues and be the cause of hypertrophic arthritis.

Treatment

It is obvious that in the treatment of a disease known to be associated with toxic factors, every effort must be directed toward their removal, and, where possible, before they can cause injury to the organism. In arthritis, all foci of infection constitute such toxic factors. It is most urgent, therefore, to discover and eradicate them completely. The various known foci or the methods of their removal will not be touched upon here, but it is desirable to emphasize with Wiltsie that while "we may now remove or drain all known and accessible foci, unless we are able to break the vicious circles and influence infection in the colon, liver, and biliary system, the lymphatics, joints, fascial sheaths and tendons, we will not be justified in anticipating a permanent cure." It does not suffice to confine ourselves to the removal of a single apparent focus, but it is necessary to take a broader view and remove all others, including those in the colon. Every endeavor must be made to eliminate infectious and toxic material from the colon before absorption has taken place. In every case of arthritis the organ must be kept clean by whatever means thought most advisable in each particular case.

Which is the most advisable and practical means of cleansing the colon? The answer can only be colonic irrigations. Snyder[26] in discussing our means for cleansing the intestines in the treatment of stasis, correctly evaluates them. Obtaining intestinal rest, he states, by starvation diet to improve muscular tone is impractical in arthritics, especially the debilitated. Excess roughage satisfactory in those able to take considerable exercise is impractical in the arthritics, in whom such exercise may be impossible or difficult. Roughage is always connected with an excess of carbohydrates which is contraindicated in this disease. Continued use of cathartics causes bowel irritation and weakens the patient. Flushing of the colon by imbibing large quantities of fluid or by duodenal lavage is often unpleasant to the patient. Appendicostomy, though valuable, necessitates operation and is in most instances impractical, especially in the weak or elderly, who usually are the victims of arthritis. Enemas, after repeated application become ineffective and cause atony and

dilatation of the lower bowel. They are often also improperly administered and effect only an evacuation of the lower colon, where harmful substances are least present. High colonic irrigations, which clean the whole colon including its proximal portion, where bacterial products and toxic substances are most numerous, and absorption most active, is therefore the most ideal and most effective method available. Alvarez[27] may be justified in criticizing the use of purgatives in cases of dyschezia. His question, "Why upset 24 feet of intestines with a purgative when the material to be removed is in the rectum or sigmoid within easy reach of a little water?" may be quite proper, but in arthritis the problem is not to empty the rectum only, where the bacteria are mostly dead, and the toxins, if formed, have already been absorbed in the upper tract — but to clean the whole gut. Wiltsie[28] in numerous articles has pleaded for attention to the colon in arthritics. In removing focal infection he begins with colonic therapy because he found the colon and liver to be invariably involved, and if first treated, many other foci may clear up spontaneously and the patient's resistance be thus improved. It is true that colonic therapy is oftentimes overdone and considerably exploited, but this is no reason for its condemnation. Scientifically, carefully and thoroughly applied, colonic irrigations offer the most helpful means of treating systemic toxemia by the elimination of intestinal obnoxious substances instrumental in attacking the organism, including articular and periarticular structures. Harmful bacteria, ptomaines, leucomaines, gases, poisonous metabolism by-products, cast-off mucus and epithelial tissue are thus removed. Irrigations are applicable without much danger or discomfort in every instance of arthritis, except perhaps in those associated with severe cardiac disease, Basedow's disease, nephrosis, and similar serious disturbances.

We employ at the Physiotherapy Department of our Institute,* high colonic irrigations in all cases of arthritis, with very satisfactory results and no serious consequences. Irrigations are administered beginning with tubes 15 inches long for low, then continued with 35 inches for medium, and 50 inches and over for high irrigations. Treatments are given every second day for 2 to 3 months, when after re-raying of the colon the future course of therapy is determined. All irrigations are preceded by a low enema to clear the lower bowel. Several gallons of bicarbonated or saline water are used at each irrigation. In some instances these are followed by injection of bacillus acidophilus culture or aqueous fluid extract of krameria, mercurochrome, or other medicated solution, as the case may demand.

In addition to irrigations for cleansing purposes, it is necessary to overcome accompanying abnormalities, displacements, angulations, kinkings, as radiographically established, associated with the arthritides. For this purpose physical modalities must be brought into play. For almost a quarter of a century the author has utilized physical therapy and pleaded for its use as a most valuable asset in the numerous internal disturbances. Its helpfulness in arterial hypertension[29], in mechanical constipation[16], in obesity[30], in cardiac disease[31], in gonococcal arthritis[32], and in other disturbances is well established. In arthritis it has its greatest application. Real results, palliative and curative, as Wolf[33] recently stated, may be expected. "Physical therapy," he says, "can in many instances act directly or indirectly on the primary causative factor, but if this cannot be eliminated, then our procedures must be selected with a view to controlling the reactions of the body tissues, to prevent an excessive defense in one case, and to stimulate an insufficient one in another." Its effect in alleviating pain and swelling, in the restoration of function of affected joints is well known. The correct application of heat and cold by the various means at our disposal, of scientific massage and exercises, of baking, diathermy and of other agencies are most beneficial in arthritis. In the correction of the accompanying colon disturbances, in addition to irrigations, measures as Morse wave current, galvanic and faradic electricity, diathermy, and the like are of great help.

It is unnecessary to say anything regarding the technic of colonic irrigation except to emphasize that it must be performed by one thoroughly familiar with this type of work; that each case must be afforded individual judgment; and that treatment must be governed by existing conditions. But colon therapy is not limited to irrigations or physical therapy alone; it may require also, as Drueck[34] reminds us, "surgery, psychotherapy, and dietotherapy, or various combinations of these. It also includes a definite disciplinary program

* The Brooklyn Diagnostic Institute.

and carefully planned and supervised training in how to live, thus giving the patient a good start on a reconstructive regimen."

Diet is a valuable means of influencing the colon. Fletcher[35] has shown conclusively that on the basis of dietary regulation, *i.e.*, proper restriction of carbohydrate intake, the adequate ingestion of proteins and fats and of a rich supply of vitamins, the colon may be made to return to a more normal condition, and thus betterment of arthritic disturbances may be obtained. The connection of diet and joint affections is clearly demonstrated by McCarrison,[36] who succeeded in producing in animals these colon abnormalities observed in arthritis through an avitamin diet and excessive carbohydrates. Burnett and Ober[37] extol the effect of diet upon the colon in joint affections. They relate of great improvement in three-fourths of their 152 arthritic cases, through the removal of the cause by anabolic nutrition, by so educating the people to eat and live as to obtain normal operation of the proximal colon, with complete absorption of food, correction of malnutrition and restoration of health. Kraetzer[38] also favors a carbohydrate-low, protein-rich diet in the intestinal toxemia of arthritis, and Fletcher and Graham[39] were able to report excellent results with their diet in a series of 60 chronic arthritics, of which 65 per cent had an abnormal colon either in tone, haustration, or length.

Many other clinicians subscribe to the value of correct dieting in arthritis, not only for its effect upon the colon but also upon the organism in general. "Excess carbohydrates aggravate latent vitamin deficiency, and to this state of malnutrition is due the susceptibility to bacterial and toxic invasion" (Fletcher).[18] Proteins, an essential foodstuff, and fat which has a vitamin B sparing capacity, are desirable substitutes for carbohydrates in the diet of arthritics. Deficient feeding with lack of vitamin B and A undoubtedly leads to a decreased resistance to infection; to a lack of vitamin A, the atrophic and destructive changes in intestinal mucosa favoring the invasion by microorganisms has lately been ascribed. Vitamin B_1 seems associated with intestinal motor function, and its deficiency to be the cause of stasis in some cases.

It is unnecessary to add, here, that to achieve the best results vaccinotherapy, medication, constitutional and other measures, wherever applicable, must be utilized to their fullest extent. Colon therapy, however, must be afforded a prominent place in the treatment of either type of arthritis.

Conclusions

1. In the main types of arthritis the difference in their symptomatology, their micro- and gross pathology, their clinical course and radiographic expressions justifies the assumption of a difference in the nature of the etiologic factor in each type.

2. Focal infection plays a most important rôle in arthritis; it may safely be accepted as an etiologic factor in the atrophic type.

3. The colon constitutes such focus; it presents a large site favorable for the colonization of innumerable bacteria, for the production of potent toxins, for their absorption and transportation into the general organism with the causation of pathologic conditions in distant organs.

4. Abnormalities in the colon are conducive to its abnormal functioning; they cause intestinal stasis with delay in elimination; they favor prolonged absorption of contained toxic products, which results in various disturbances, including arthritis.

5. Many well known bacteria of the colon are known to be the cause of definite diseases; isolation of the streptococcus in numerous arthritis cases now definitely identifies this organism with the cause of arthritis and justifies the use of biologic therapy in cases where so isolated.

6. The colon, being the depot of poisonous by-products resulting from faulty digestion of proteins, fats, and carbohydrates, either because of ferment dysfunction or bacterial action, is the source of various degenerative affections, including hypertrophic arthritis.

7. The desirability of the removal from the colon of all toxic products, whether of bacterial or metabolic origin, is undisputable; hence cleansing of the colon by the best means at our disposal should occupy a very important part in the treatment of arthritis.

8. Besides cleansing, all pathological abnormalities found in the colon must also be corrected; all measures available, physical therapy, dietetics, surgery and other helpful means, must be utilized for this purpose.

9. To obtain the most satisfactory results the use of all other measures, hygienic, dietetic, hydriatic, biologic, orthopedic, must not be neglected, but must be applied

judiciously in the treatment of each case of arthritis.

867 St. Marks Avenue.

References

1. Hill, F. C. and Monroe, R. T.: Thyroid Gland Efficiency in Chronic Arthritis, J. Lab. & Clin. Med. **18**:5 (Feb.) 1933.
2. Pemberton, Ralph: The Present Status of the Problem of Arthritis, J. Lab. & Clin. Med. **15**:1055 (Aug.) 1930.
3. Cecil, Russell L.: Rheumatoid Arthritis, A New Method of Approach to the Disease, J. A. M. A. **101**:5 (July 29) 1933.
4. Allison, N. and Gormley, R. K.: Diagnosis in Joint Diseases, New York, Wm. Wood, 1931.
5. Wiltsie, J. W.: Chronic Focal Infection, Arch. Phys. Therap., X-Ray, Rad. **15**:210 (April) 1934.
6. Pemberton, Ralph: Arthritis and Rheumatoid Conditions, Their Nature and Treatment, Philadelphia, Lea & Febiger, 1930.

Idem: The Nature of Arthritis and Rheumatoid Conditions, J. A. M. A. **75**:1759, 1920.

Idem: The Metabolism and Successful Treatment of Chronic Joint Disease, Am. J. Med. Sc. **144**:474, 1912.

Pemberton, Ralph; Hendrix, B. M., and Crouter, C. Y.: Studies in Arthritis, J. Metab. Research **2**:301, 1922.

Pemberton, R., and Peirce, E. G.: The Relation of Intestinal Treatment and Diet to the Treatment of Arthritis, Ann. Int. Med. **5**:1221 (Apr.) 1932.

7. Rosenow, E. C.: Oral Focal Infection as a Cause of Systemic Disease, Med. J. & Rec. **123**: 657 (May 19) 1926.

Idem: Etiology of Arthritis Deformans, J. A. M. A. **62**:1146 (April) 1914.

8. Cecil, Russell L.: Diagnosis and Treatment of Arthritis, New York, Oxford University Press, 1931.
9. Cox, K. E., and Hill, D. F.: Chronic Arthritis, Arch. Int. Med. **54**:27 (July) 1934.
10. Cecil, R. L.; Nichols, E. E., and Stainsby, W. J.: The Bacteriology of the Blood and Joints in Chronic Infectious Arthritis, Arch. Int. Med. **43**:57 (May) 1929.
11. Dawson, M. H.; Olmstead, M., and Boots, R. H.: Bacteriologic Investigation on the Blood, Synovial Fluid and Subcutaneous Nodules in Rheumatoid Arthritis, Arch. Int. Med. **49**:173, 1932.

Idem: Agglutinin Reactions in Rheumatoid Arthritis, Am. J. Med. Sc., **181**:12 (Jan.) 1931.

Idem: Proc. So. Exp. Biol. & Med. **28**:419, 1931.

12. Keefer, C. S.; Myers, W. K., and Oppell, P. W.: Streptococcal Agglutinins in Patients with Rheumatoid Arthritis and Acute Rheumatic Fever, J. Clin. Invest. **12** (Mar.) 1933.
13. Nichols, E. F., and Richardson, F. L.: Arthritis Deformans, Med. Rec. **21**:149, 1909.
14. Burnett, F. L. and Roberts, F. R.: Arthritis, Anabolic Nutrition and Health, Am. J. Sc. **188**:7 (July) 1934.
15. Kantor, J. L.: Colon Studies, J. Am. Gast.-Enter. Assn. **30**:137, 1928; **29**:147, 1927; Am. J. Roent. **17**:405, 1927.
16. Gutman, J.: Physiotherapy in Mechanical Constipation, Physical Therapeut. **45**:2 (Feb.) 1927.
17. Cotton, H. A.: The Relation of Chronic Sepsis to the So-called Functional Mental Disorders, J. Ment. Sc., Oct., 1923.
18. Fletcher, A. A.: The Nutritional Factor in Chronic Arthritis, J. Lab. & Clin. Med. **15**:11, 1930.
19. Redewill, F. H.; Potter, J. E., and Garrison, H. A.: Colon as a Site of Focal Infection in Chronic Pyelitis, Cystitis and Prostatitis, J. A. M. A. **94**:688, 1930.
20. Bassler, Anthony: Diseases of Intestines, Philadelphia, F. A. Davis Co., 1928.
21. Crowe, H. W.: The Specific Vaccine Treatment of Chronic Arthritis and Rheumatism, J. Lab. & Clin. Med. **15**:1072, 1930.
22. Traut, E. F., and Herrold, R. D.: A Simple Method of Making Cultures of the Rectum, J. Infec. Dis. **45**:172, 1929.
23. Traut, E. F.: The Rôle of the Bowel in Chronic Arthritis, Ann. Int. Med. **6**:913 (Jan.) 1933.
24. Synnott, M. J.: Intestinal Toxemia, its Diagnosis and Treatment, Med. J. & Rec. **134**: 11 (Dec. 7) 1932.

Idem: The Toxic Colon, Med. J. & Rec. **131**: 121 (Feb. 5) 1930.

25. Eppinger, H. and Gutman, J.: Intestinal Intoxication, Med. Rec. Aug. 29, 1914.
26. Snyder, R. G., and Fineman, S.: A Clinical and Roentgenologic Study of High Colonic Irrigations as Used in the Therapy of Subacute and Chronic Arthritis, Am. J. Roentg. **17**:27 (Jan.) 1927.
27. Alvarez, W. C.: The Mechanics of the Digestive Tract, New York, Paul B. Hoeber, Inc., 1928.
28. Wiltsie, J. W.: Chronic Intestinal Toxemia, Int. J. Med. & Surg. **46**:165 (Apr.) 1933.

Idem: Treatment of Colon Infection, Med. J. & Rec. **129**:215 (Feb.) 1929.

Idem: The Cecum as a Focus of Infection, Clin. Med. & Surg. **39**:504 (July) 1932.

Idem: Colonic Therapy, Arch. Phys. Therap., X-Ray & Rad. **14**:479 (Aug.) 1933.

29. Gutman, J.: Arterial Hypertension and Physical Therapy, Arch. Phys. Therap., X-Ray & Rad. **10**:259 (June) 1929.
30. Gutman, Jacob: Treatment of Obesity, New York Med. J. **103**:161 (Jan. 22) 1916.

Idem: The Urgent Need for a Greater Use of Physical Therapy by Internists, New York Med. J. & Rec. **118**:13 (July 4) 1923.

31. Idem: Physical Therapy in Cardiac Disease, Arch. Phys. Therap., X-Ray & Rad. **12**:401 (July) 1931.

Idem: Physical Therapy in Cardiac Disturbances, Trans. Am. Therap. Soc., 1931.

32. Idem: The Treatment of Gonorrheal Arthritis, Long Island Med. J. **21**:568 (Oct.) 1927.
33. Wolf, H. F.: New Conceptions of Arth-

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EDITORIALS

PRIORITY IN SHORT WAVE THERAPY

The increasing interest in short and ultrashort wave therapy is indirectly responsible for advancement of claims of priority both here and abroad. Such claims are no novelty in scientific discoveries when due to the efforts of more than one person. Even when a single individual has announced a discovery, complete in itself, it was not unusual to hear of claims for intimately related research. If such claims were matters of individual gratification they could well be ignored, but in every important scientific advance its historic background interests every practitioner who is not content with mere technical knowledge. This in part explains the interest in the question of who is entitled to credit for the method of therapy which is widely acknowledged to possess characteristics different from and superior to diathermy.

Any attempt to settle the priority question in what we prefer to call "radiothermy," must not only be founded on an historic basis but must take into consideration that before there could have been any thought of high frequency therapy there must have been high frequency apparatus. The engineer devising such an apparatus or any of its essential parts, such as the lamp or circuit, is as entitled to credit as is the physiologist who has found its biologic effects, and the clinician who has opened paths for its therapeutic application. In the case of radiathermy the situation becomes somewhat complicated because research has been carried on independently in widely separated lands, and national pride tends to emphasize the contributions in home territory.

Viewing the problem impartially, one must go back to the labors of the German physicist Heinrich Rudolf Hertz, who, in 1888, demonstrated that the waves named in his honor can be propagated through space, reflected, and polarized like light. It is unquestioned that the discovery of wireless telegraphy is the direct outcome of Hertz's great experimental work. Yet even he cannot be accorded the palm for absolutely independent thought, for in the last analysis Hertz was only a continuator of Faraday and Clerk-Maxwell.

From the standpoint of more immediate and practical interest, however, there is no doubt that it is due to the genius of the French electrophysiologist, d'Arsonval, that we owe an eternal debt of gratitude for whatever benefits have been and will be derived from short and ultrashort wave therapy. Nor can there be any dispute in a chronologic sense, for we have the incontestable evidence that it was on May 2, 1891, that d'Arsonval present-

ed the fruits of his epochal research[1], a document which may well be accepted as the *magna charta* of high frequency therapy. Nor was the work of that master-mind permitted to remain a mere laboratory contribution. A number of d'Arsonval's qualified compatriots at once plunged into practical labors, the details of which have been presented in 1931, by Saidman and Cahen.[2] So much has been written on the development and clinical use of high frequency therapy in many countries beyond the borders of France that their mere enumeration would fill many pages. All these labors dealt with diathermy, a procedure of high frequency therapy with long waves, whose principal if not sole effect on human tissues is thermic in nature.

When it comes to radiathermy, however, we must realize that we are not dealing merely with diathermy produced by short or ultrashort waves, because while in its clinical application a *mild* heating sensation is an accompanying feature, other physicochemical effects also play a rôle.[3] In other words, while in diathermy the aim is to raise the temperature of parts of the body as a direct objective, in radiathermy the heating effect is kept down to the minimum, reliance being had on certain selective qualities of the irradiated biologic structures.

The discovery of short and ultrashort waves for medical purposes is one that cannot be separated from the basic discovery and subsequent studies by d'Arsonval and his followers. The imperfection of the original apparatus has naturally stirred engineers to improve it, while much experimental work was adding valuable information regarding its biological and clinical usefulness. Thus, to illustrate, it was demonstrated that the treatment of neuralgias is fruitful only when the smallest possible intensities are used while even average intensities aggravate the condition.

When it comes to the question of priority, one cannot ignore the fact that the "distant heating effect" of short wave transmitters was discovered not by experts but by amateurs and lay workers. This phenomenon naturally aroused the attention of electrophysicists and electrophysiologists, but there is no doubt that priority for the creation of the new condenser field technics is due to the American, Schereschewsky.[4] Study of his contributions, the first of which was published in 1926, leaves no room for doubt that he is the real creator of modern short wave therapy. That he alone could not possibly cover all concerned problems of a field which is still in its incipiency, and which is certain to be greatly enlarged in the very near future, hardly needs proof.

Thus the Americans, Christie and Loomis,[5] and Hosmer[6] are entitled to priority in establishing the dependence of the heating of an electrolyte on frequencies. Similar findings were arrived at independently by the Germans Pätzold,[7] and Burtstyn,[8] but as their publications appeared much later than those of the American investigators, they are entitled to much credit but not to priority.

From the purely therapeutic standpoint the Austrian investigator Stieböck is entitled to priority as an advocate of the highest frequencies. His first contribution[9] dates back to 1925. Schliephake,[10, 11] whose name is the most prominent in short and ultrashort wave therapy did not present his labors in this subject until 1928, but they had been carried on independently for some time before that date, and his work is of a nature easily to stamp him as the actual founder of clinical radiathermy.

There is already a large number of splendid publications on the subject of short and ultrashort waves in the electrotechnic, electrophysiologic, and electrotherapeutic domains. One is tempted to single out others who have added valued information in their respective fields of labor, but from the standpoint of priority the above historical data will suffice. There is glory enough for all earnest workers and the future holds additional laurels to be earned. Physicists, physiologists, and therapists may still find new paths even though the pioneering labors have already been achieved.

References

1. d'Arsonval, Arsène: For details see d'Arsonval Jubilee Number, Arch. Phys. Therap. X-Ray, Rad. **13** (Dec.) 1932.

2. Saidman, Jean, and Cahen, Roger: Les ondes hertziennes courtes en thérapeutique. Paris: Doin & Cie, 1931.

3. Kobak, Disraeli: Radiathermy in Medicine, Arch. Phys. Therap. X-Ray, Rad. **16**:5 (Jan.) 1935.

4. Schereschewsky, J. W.: Public Health Reports, No. 1110, 1926.

5. Christie, R. V., and Loomis, A. L.: Relation of Frequency to Physiological Effects of Ultra-high Frequency Currents, J. Exper. Med. **49**:303 (Feb.) 1929.

6. Hosmer, H. R.: Science **48**:325, 1928.

7. Pätzold, Johannes: Ztschr. f. Hft. **36**, 1930.

8. Burstyn, W.: Funk. **13**, 1930.

9. Stiebőck, L. H.: Ztschr. f. physik. Ther. **4**, 1925.

10. Schliephake, Erwin: Die biologische Wärmewirkung im elektrischen Hochfrequenzfeld. Trans. of the German Soc. for Internal Med., 1928. Idem. Die Reaktionsweise des Organismus auf Kurze elektrische Wellen. Hyperthermie als elektrobiologische wirkung. Klin. Wchnschr. **7**: 1600 (Aug. 19) 1928.

IMPRESSIONS OF THE MID-WESTERN MEETING

With the interest of the majority of the members of the Congress centered upon the annual national meetings, it is appropriate to point out that the regional meetings, too, have proven of great value from more than one point of view. This has again been demonstrated by the mid-western section which convened on March 12th, at the capitol of the State of Wisconsin.

As was announced, the program consisted of forenoon clinics, of six papers presented during the afternoon, and of two special addresses delivered under the auspices of the Dane County Medical Society following a "get-together" dinner. Not on the program was an informal talk during luncheon by Dr. Buerki, superintendent of the Wisconsin General Hospital, a teaching institution of the state university. This talk dealt rather extensively with the organization and administration of the physical therapy department of the hospital, with especial referenee to the relation of that department to the staff of physicians and surgeons, and to the economic problems concerning the upkeep of the personnel and equipment so as to afford the patients the best possible therapeutic results. There was no lack of rapid fire questions, to all of which the able executive gave prompt replies, many of which will aid those interested in hospital administration to overcome certain economic and organizational difficulties.

The scientific part of the program was ably presided over by the sectional chairman, Dr. James C. Elsom, professor and director of the physical therapy department of the University of Wisconsin.

As the papers and addresses that were presented at the one-day meeting are to be published in the ARCHIVES, the readers will have an opportunity to appreciate their scientific merit. We need, therefore, merely sketch some of the striking features of the sessions.

The clinical part of the program consisted of a series of three demonstrations for each of which a large number of patients, men, women and children, were utilized. The management of fractures, the treatment of arthritis, and the methods to ameliorate the effects of infantile paralysis were demonstrated in detail to a capacity audience in a large amphitheater. After each group-demonstration by representatives of the surgical, orthopedic, and physical therapy departments, members and visitors were afforded an opportunity to discuss what they had observed. The keynote was sounded by Ewerhardt, of St. Louis, who pointed out the value of the demonstrations, particularly those dealing with massage, therapeutic exercise and manipulation, because they taught the valuable lesson that they must be kept within physiologic limits if they are to be productive of good results. His own experience was given with admirable frankness. Tempted at first to do too much, he accomplished more harm than good, and it was only after he had learned by sad experience to obey the laws of physiology that mechanotherapy in his hands brought relief to his patients. The practical application can hardly be taught successfully by lectures or books, so that the clinical demonstrations yielded valuable instruction in technics and end results. In brief, then, the lesson that was carried away from the forenoon program was the need for a sane conservatism which must be observed in the application of all physical therapeutic measures.

During the afternoon session Lederer, of Chicago, presented a scholarly paper on cancer of the nasal sinuses, which, apart from its diagnostic and pathologic interest, showed the great value of electrosurgery and radiotherapy in what was and still is an almost hopeless condition when treated by other means. Lederer showed by lantern slides the actual operative technic and its results, work which was given unstinted praise by all who

discussed the paper. Rolnick, of Chicago, discussed the problem of electrosurgery for prostatic hypertrophy. His attitude towards the procedure was rather conservative, for he had come to the conclusion that about 60 per cent of prostatics was benefited by transurethral electroresection, while for the remaining 40 per cent only classic prostatectomy can achieve effectiveness. In the discussion, Sisk, of Madison, surprised not a few by the statement that whereas in the beginning he had rejected transurethral resection as an unsound procedure, he nevertheless gave it a trial with the result that today he employs this method in almost all of his cases, classic prostatectomy being performed only in about one per cent. However, one may try to reconcile the opposing views, the main conclusion is unassailable that electrosurgery has proven a boon in the management of certain types of prostatic hypertrophy. Arnold S. Jackson, of Madison, pointed out in a paper dealing with the relation of physical therapy to surgery, that he "drifted" into the field almost by accident and with a certain skepticism. Today he would not think of performing a thyroidectomy except electrosurgically, a procedure he described at some detail. Blech, of Chicago, in discussing Jackson's paper entered a fervid plea for physiologic thinking by all clinicians, including surgeons. He sketched the basic thoughts of August Bier which resulted in the therapeutic application of artificial hyperemia, arterial, venous, and mixed. He emphasized that while diathermy had completely antiquated the simple but less effective heating appliances devised by Bier, there are still the venous and mixed forms which in spite of their comparative simplicity of application and great therapeutic effectiveness are ignored by surgeons. Similarly Finsen and Bernhard have shown the great value of heliotherapy in all forms of tuberculosis, so much so that the term surgical tuberculosis is about to become a misnomer. Surgery and especially orthopedic surgery still is resorted to when the ideal sought favors complete anchylosis of joints in contrast to normal recovery by physical measures. The ideal in surgery is to reduce operative therapy to the minimum and physical therapy has already demonstrated its usefulness from that point of view. Coulter, of Chicago, in a paper on arthritis, stressed the fact that it is a protean disease due to different etiologic factors, which dictate strict individualization in every given case. The various physical therapeutic measures must be characterized by simplicity and applied according to indications, and that in a manner of scientific precision, so that the utilization of technicians must remain under scientific supervision.

Throughout all discussions the *leitmotif* was that physical therapy is an indispensable adjunct to general medical and surgical therapeusis. This was especially stressed in an eloquent address by Mock, of Chicago, who, as chairman of the Council on Physical Therapy of the American Medical Association, so to speak, put the stamp of approval of organized medicine on the present status of scientific physical therapy. The program was concluded by Gaenslen, of Milwaukee, also a member of the Council on Physical Therapy, who presented a masterly review of the advances made in the rehabilitation of the disabled, an address which was replete with technical information.

This year's midwestern session brought forth fruits similar to those mentioned in connection with the 1934 session in Indianapolis Again one could not fail to notice that the deliberations presented by men of authority inspired all within their hearing to a greater appreciation of the clinical value of physical therapy. The regional meetings which have been instituted about three years ago have already demonstrated that they have a definite place in the scheme of activities of the *Congress.* It is certain, therefore, that they will be continued in the future with even greater enthusiasm.

SPRING SESSION EASTERN SECTION, BALTIMORE, MARYLAND

Announcement is made of the meeting of the Eastern Section of the Congress, to be held in Baltimore, Maryland, Friday and Saturday, March 29 and 30, 1935.

Friday, March 29, will be devoted only to an evening meeting in joint session with the Baltimore City Medical Society to be held at the Medical and Chirurgical Faculty Building. Saturday morning, the sessions will be held in the Hurd Memorial Amphitheatre of Johns Hopkins Hospital. Luncheon will be served promptly at 12:30 on the Fifth Floor of the Phipps' Psychiatric Building of Johns Hopkins Hospital. The Afternoon session

will be held at the University of Maryland. Immediately following the Afternoon session busses will conduct the guests to the Children's Hospital School. A banquet will close the session at 7:30 P.M. at the Hotel Belvedere. The officers of this section are, Chairman, Dr. Grant E. Ward, Baltimore; Secretary, Dr. Madge C. L. McGuinness, New York, and Chairman of the Program Committee, Dr. John D. Currence, New York.

Scientific Program

Evening Session, Friday, March 29, 1935

Medical and Chirurgical Faculty Building, 1211 Cathedral Street, in joint meeting with the Baltimore City Medical Society.

1. Light Therapy, *Frank Hammond Krusen*, M.D., Associate Dean, Temple University School of Medicine; Director, Physical Therapy Department, Temple University Hospital, Philadelphia.

2. Physical Therapy in Traumatic Surgery, *Henry H. Ritter*, M.D., Assistant Professor, Clinical Surgery, New York Post Graduate Medical School, Columbia University; Chief, Traumatic Surgery Clinic, New York Post Graduate Hospital; Attending Surgeon, Reconstruction Hospital, New York.

3. Short Wave Therapy, *William Bierman*, M.D., Director, Department of Physical Therapy, Beth Israel and Sydenham Hospitals, New York.

Morning Session, Saturday, March 30, 1935

Hurd Memorial Amphitheatre, Johns Hopkins Hospital.

1. Address of Welcome, *Warfield T. Longcope*, M.D., Professor of Medicine, Johns Hopkins Medical School, Baltimore.

2. Physical Therapy from the Standpoint of an Internist, *Thomas P. Sprunt*, M.D., Director, Physical Therapy Department, Johns Hopkins University, Baltimore.

3. Some Recent Experiences with Iontophoresis in the Treatment of Arthritis, *Lay Martin*, M.D., Instructor in Medicine, Johns Hopkins University, Baltimore.

4. Demonstration of Apparatus for Continuous, Controllable, Passive Motion in the Treatment of Joints, *Harold R. Bohlman*, M.D., Instructor in Orthopedic Surgery, Johns Hopkins University, Baltimore.

5. The Study of Muscle Balance in Scoliosis, *Raymond E. Lenhard*, M.D., Instructor in Orthopedic Surgery, Johns Hopkins Medical School, Baltimore.

Luncheon at 12:30 Promptly Fifth Floor Phipps' Psychiatric Building, Johns Hopkins Hospital. Subscription price, $1.00.

University of Maryland Hospital.

Afternoon Session, Saturday, Mar. 30, 1935

1. Address of Welcome, *A. J. Lomas*, M.D., Superintendent, University Hospital, Baltimore.

2. Irradiation Therapy of Carcinoma of Cervix Uteri, *Jack Mason Hundley*, Jr., M.D., Associate in Gynecology, University of Maryland; Instructor in Gynecology, Johns Hopkins University, Baltimore.

3. Passive Vascular Exercises in the Treatment of Peripheral Vascular Disturbance, *George H. Yeager*, M.D., Assistant in Surgery, University of Maryland, Baltimore.

4. Treatment of Delayed Union of Fractures, *Allen F. Voshell*, M.D., Professor of Orthopedic Surgery, University of Maryland, Baltimore.

5. Diathermy and Regeneration of Bone, An Experimental Study, *E. David Weinberg*, M.D., Instructor in Orthopedic Surgery, Johns Hopkins University; and *Grant E. Ward*, M.D., Instructor in Surgery, Johns Hopkins University, and University of Maryland, Baltimore.

Greenspring Avenue and 41st Street. (Busses will leave University Hospital directly following the afternoon session.)

5:00 P. M., Children's Hospital School

1. Demonstration of Testing Muscles in Poliomyelitis and Scoliosis Cases, *Henry O. Kendall*, M.D., Director of Physical Therapy, Children's Hospital School, Baltimore.

2. Inspection of Children's Hospital School Physical Therapy Equipment.

7:30 P.M. BANQUET. Hotel Belvedere, Charles and Chase Streets. Subscription Price, $2.25.

SCIENCE, NEWS, COMMENTS

March Meeting of New York Physical Therapy Association

On Wednesday March 6, the stated meeting of the New York Physical Therapy Society was held in the Auditorium of the Beth Israel Hospital. The scientific session consisted of:

1. The Use of Iontophoresis — Case Illustrations, H. L. Levant, M.D.

2. Plea for Early Treatment of Bell's Palsy — Case Illustrations, S. Gottesman, M.D.

3. The Use of Thermostatically Controlled Heating Hood in the Treatment of:
   (a) A Case of Thrombo-angiitis Obliterans,
   (b) Diabetic Arteriosclerosis with Gangrene, J. R. Almer, M.D.

4. Temperature Measurements in the Female Pelvis During Diathermy, E. A. Horowitz, M.D.

5. Treatment of Gonorrheal Vaginitis by Means of Diathermy — Case Illustrations, D. Derow, M.D.

6. Treatment of Gonorrheal Arthritis by Means of Hyperpyrexia — Case Illustrations, C. L. Levenson.

General discussion.

The Executive session which followed was presided over by Dr. Charles F. McCarty, and Dr. Madge C. L. McGuinness, President and Secretary, respectively of the New York Physical Therapy Society.

March Meeting of Pacific Physical Therapy Association

At the meeting of the Pacific Physical Therapy Association held at the Hollywood Hospital, Wednesday, March 20, 1935, the following program was presented:

SYMPOSIUM ON HYPERPYREXIA

1. Electrical Production of Fever with Special Reference to the Short Wave Diathermy. History of Fever Therapy at Santa Barbara Cottage Hospital, *Rodney F. Atsatt,* M.D., Santa Barbara;

2. Comparative Analysis of Heat Production, *C. J. Breitwieser,* M.S., E.E., Calif. Institute of Technology, *J. Severy Hibben,* M.D., Pasadena;

3. Hydrotherapeutic Methods, *Cora Smith King,* M.D., Pasadena;

4. Malaria Treatment with Comparative Evaluation of the Various Methods, *Ross Moore,* M.D., Los Angeles.

Ontario Dental Association

The Annual Convention of the Ontario Dental Association will be held at the Royal York Hotel, Toronto, on May 20, 21 and 22, 1935. A very fine programme of essays and clinics has been prepared. Ethical dentists of Provinces of Canada, outside of Ontario, and, from the United States are invited to attend as guests of the Ontario Society.

Lt. Comdr. Malcolmson Reads Paper

On February 15, Lt. Comdr. Joseph E. Malcolmson (M.C.) U. S. N., Ninth Naval District, Detroit, Michigan, read a paper before the Medical Section of the Toledo Academy of Medicine, on "The Rôle of a Medical Officer in the U. S. Navy."

New Anesthetic, Evipan, May Be Useful in Childbirth

A white crystalline tasteless powder which puts the patient to sleep in a minute or even less time is one of the new substances discovered in the search for the perfect anesthetic. It is called evipan in Europe and evipal in this country.

It was devised by German scientists. How well it has worked in actual practice was reported to the Congress of Anesthetists by Dr. Hans Widenhorn of the University of Freiburg, Germany, and Drs. Ronald Jarman and A. Lawrence Abel of the Woolwich War Memorial Hospital, England. In the form of a clear solution in water, evipan is injected into a vein and the patient goes quickly and quietly to sleep. There is none of the excitement and nervousness at the beginning of the anesthesia, or the vomiting and nausea afterwards that occur with some other anesthetics such as ether.

The patient awakens quickly from evipan anesthesia which usually lasts for about 20 minutes. When it is necessary to prolong the anesthetic period, Dr. Widenhorn augments the effect of evipan with ether or nitrous oxide. Drs. Jarman and Abel prolonged its effect by repeating the dose.

Evipan is not excreted from the body by passing into the air through the lungs, like ether, but by chemical breakdown in which the liver plays an important part. For this reason evipan is particularly useful for operations on patients suffering from lung disease but should not be used on patients suffering from liver or gall bladder disease. It may also be used in childbirth since with it "something similar to twilight sleep may be obtained," according to Dr. Widenhorn. — *Science News Letter,* October 27, 1934.

X-Ray Movies Show Heart Wanders in New-Born Baby

X-ray motion pictures dispelled a recent scare of thymus deaths among new-born infants, Dr. Robert F. James, research physician of the Westinghouse Electric Co., reported to the Society of Motion Picture Engineers.

"X-ray photographs," Dr. James reported, "disclosed a large shadow in the vicinity of the thymus, a ductless gland in the upper section of the chest. But none of these infants showed typical symptoms of the disease and subsequent x-ray pictures failed to show the shadow.

"The attending physicians who observed the shadow concluded that the penetrating x-radiation used in making the photographs checked the thymus enlargement. When continuous x-ray motion pictures were made, however, the shadow taken to be an enlarged thymus was found to be merely the shadow of the infant heart, coming and going with the pulse."

In new-born infants, Dr. James indicated, the positions of the organs of the body are not completely fixed as they are later in life. The hearts of these infants suspected of thymus enlargement were simply in an unexpected place. Without motion pictures by x-rays the phenomenon would not have been disclosed. — *Science News Letter*, November 10, 1934.

Childless Couple's Chance for Family Now Doubled

Women who seek medical aid to overcome involuntary childlessness now have double the chance of realizing their natural dream of bearing children of their own, it appears from results obtained at the Evans Memorial Institute, Massachusetts Memorial Hospitals.

The secret of success in bringing the boon of children to previously childless couples lies in recognition of the fact that childlessness may be due to multiple causes operating in both partners to the childless marriage, Dr. Allan Winter Rowe, director of the institute, told members of the American College of Surgeons at one of the "show me" clinics of their congress.

Fifty out of 100 couples were helped to have children of their own by Dr. Rowe and his colleagues. Reports in medical literature show that the best results previously obtained have enabled only 25 out of every 100 couples to achieve parenthood. Working with Dr. Rowe in his efforts to overcome involuntary infertility were Dr. Samuel R. Meaker, Dr. Samuel N. Vose and Dr. Charles H. Lawrence.

The first step in the proceedings to help the childless couples was a thorough study of the histories and physical condition of both husband and wife. These studies and examinations showed that both the men and the women were suffering from a number of constitutional and glandular abnormalities. Disorders in varying degrees in both men and women were found in thyroid, pituitary and sex gland functions. Anemia, over- and under-weight, depressed energy metabolism, low blood pressure, signs of liver injury indicating toxic conditions, and venereal, tuberculous and other infections were found in both men and women.

Only nine of the men and three of the women were adjudged normal. With some exceptions, no one of the abnormalities found would by itself have prevented the couple from having children, Dr. Rowe explained. But the combination of several of the abnormalities in both partners to the marriage were in his opinion sufficient to cause the childlessness. In order to raise the chance of the couple for having children to its very highest, all the abnormal conditions had to be corrected. The constitutional, depressed energy metabolism, malnutrition and disordered liver function played a major rôle in contributing to the childlessness, he believes.

Success in "doubling the batting average" of involuntary childless couples resulted from discovering and correcting all the abnormalities. — *Science News Letter*, October 27, 1934.

Animals "Go to Sleep" in Heavy Water Bath

Something very much like hibernation, or the almost death-like sleep in which certain animals rest for parts of their lives, can be produced by heavy water, containing the recently discovered double-weight hydrogen atoms. Experiments indicating this were reported before the meeting of the American Association for the Advancement of Science, by Dr. T. Cunliffe Barnes and E. J. Larson of Yale University.

Dr. Barnes and Mr. Larson used flatworms, a relatively primitive life-form, in their investigations. Flatworms kept for months in a dilute solution of heavy water in ordinary water were still the same size as they had been at the start. Other flatworms, kept in pure ordinary water as "controls," had lost four-fifths of their size after the same period. Slower chemical reactions of digestion, and slower life-processes generally, indicated the "sleepiness" of the animals in the heavy water solution. — *Science News Letter*, January 19, 1935.

Chemists Honor Discoverer of Artificial Rubber

Father Julius A. Nieuwland, professor of organic chemistry at the University of Notre Dame, has been awarded the William H. Nichols medal of the New York section of the American Chemical Society. The honor, it is announced by the award committee, is for his "basic work on syntheses from unsaturated hydrocarbons." This means simply, Father Nieuwland's decade of research on artificial rubber.

Working on reactions possible with acetylene — the gas used in welding torches and in old-fashioned automobile headlights — Father Nieuwland made discoveries which subsequent research utilized in making the synthetic rubber known as duprene.

Duprene, while having the elastic properties of natural rubber, is highly resistant to the action of gasoline and other rubber solvents as the natural product is not.

While artificial rubber cannot be made as cheaply, at present, as natural rubber can be produced, the synthetic rubber products of the duprene type serve as a valuable check to control the price.

During wartime and by means of special cartels rubber has often sold as high as $1.25 a pound. Now it is said that the cartels dare not raise the price of natural rubber above 20 a pound.

Based on America's annual consumption of rubber, it is estimated that 375 million dollars a year is saved due to the difference in the present price of rubber and what it might be if there were no artificial competitor at hand to serve as a check against price-raising. — *Science News Letter*, December 29, 1934.

New Short Wave Station Opened at Harvard

A new short wave station, equipped with a beam antenna which allows the broadcasting of radio waves in a straight line, has been constructed on the roof of the physics building at Harvard University by Prof. Harry R. Mimno.

The experimental station operates on a wavelength of five meters. Its antenna can be elevated or depressed on a horizontal axis as well as turned from side to side. At present it is carrying on communication with the short wave stations at Blue Hill Observatory, Mass., and West Hartford, Conn.

Because short waves travel in optical lines, that is, in lines similar to beams of light, it was thought until recently that such waves could not go more than fifty miles due to the blocking effect of the horizon. Very rarely do short waves reflect from the Heaviside layer, according to Prof. Mimno. When it was recently found that the station in West Hartford, more than eighty miles away from Boston and across a range of hills, could receive the signals, new evidence was provided that indicates the short wave theory needs revision. — *Science News Letter*, December, 8, 1934.

Obituary

The Congress wishes to announce the passing of one of its pioneer members, Dr. H. E. Day of Dumont, Iowa.

(*Continued from page 170*)

ritis and their Relation to Physical Therapy, Arch. Phys. Therap., X-Ray & Rad. **15**:405 (July) 1934.

34. Drueck, C. J.: Newer Concepts of Colonic Disease, Med. Times & Long Island Med. J. **62**: 76 (Mar.) 1934.

35. Fletcher, A. A.: The Nutritional Factor in Chronic Arthritis, J. Lab. & Clin. Med. **15**: 1140 (Aug.) 1930.

36. McCarrison, R.: A Good Diet and a Bad One, Brit. Med. J. **2**:730, 1926.

37. Burnett, F. L. and Ober, F. R.: Arthritis, Anabolic Nutrition and Health, Am. J. Med. Sc. **188** (July) 1934.

38. Kraetzer, A. F.: Intestinal Toxemia, Med. Times & Long Island Med. J. **62**:40 (Feb.) 1934.

39. Fletcher, A. A. and Graham, D.: The Large Bowel in Chronic Arthritis, Am. J. Med. Sc. **179**:91 (Jan.) 1930.

40. Burbank, R. and Hadjopoulos, L. G.: Serologic Significance of Streptococcus in Arthritis and Allied Conditions, J. A. M. A. **84**:9 (Feb.) 1925.

Discussion

Dr. Reginald Burbank (New York): For years we have been preaching that arthritis is a joint manifestation of systemic disease, and that chronic low grade infection with bacteria that have attained a relatively high degree of civilization is responsible for at least the majority of joint symptoms. These bacteria have developed the ability to live in a relative oxygen deficiency, and are able to ferment mannite and thus become deep tissue invaders. The natural habitat of such organisms is the intestinal tract, and even though the initial focus of infection be removed there is nearly always a secondary implant of these focal strains which adapts itself to life in its new environment and becomes a potent source of arthritic manifestations.

The enterococci are practically all mannite fermenters. They are, with the greatest difficulty, killed by heat. They are not highly invasive and consequently arouse no violently immune reaction on the part of the host. Their invasion is insidious, and, the reason that more investigators have not given them serious consideration is because they are poor agglutinators and give rise to very little antibody formation. This fact makes many bacteriologists consider them nonpathogenic . . . . . These mannite fermenters are almost invariably arthrotropic when injected into animals, and this type of organism is found in rich growth in the stools of more than 95 per cent of the arthritic cases that come under our observation.

Stasis, fermentation, spasticity, and the like, all produce irritation of the intestinal wall and permit the permeation of a mucous membrane which, in a healthy state, is only with great difficulty permeable to bacteria. Consequently we feel that the proper care of the arthritic demands adequate care of the colon, for though the active breeding ground of these enterococci is higher up, the major absorption seems to take place in the ascending and transverse colon, and properly given colonic irrigations are the most satisfactory means we have of freeing this area from toxic substances, accompanied by such adjuvants as give prospect of relief without the possibility of causing the patient any injury.

In addition we must restrict the patient in such articles of diet as tend to promote prolific growth of deleterious organisms, and attempt to obviate from the diet such articles of food as the patient is not able to digest adequately or which prove to be irritant to the individual mucous membranes. . . . . A diet adequately rich in vitamins has, in our experience, had a healing effect and a tendency to reduce inflammatory reaction not only in the colon but also in the mucous membranes of the nasopharynx.

THE STUDENT'S LIBRARY

STRAHLUNG UND LICHTERYTHEM (Radiation and Light Erythema). By *K. W. Hausser* and his Collaborators. Edited by C. Ramsauer and R. Kollrath. Cloth — XII-o. Pp. 89 with 19 illustrations. Leipzig: Akademische Verlagsgesellschaft. 1934.

The value of this small book will be appreciated from the fact that it is published as an issue of the famous "Classics of the Exact Sciences" founded by Wilhelm Ostwald. Hausser died in 1933. His premature demise was regarded throughout the scientific world as an irreparable loss to biophysics and biochemistry. The editors have selected from his writings with the collaboration of several of his associates his outstanding contributions for preservation in durable form. In the small book under consideration we also find their annotations and comments which are of great interest.

There are four contributions dealing with the dependability of light erythema and pigmentation of the skin on the number of oscillations of the light source; sun burns and sun tanning; skin erythema dosage as a biologic measure of the effects of radiation; and sensitivity in relation to light erythema. These four separate essays have a direct relation to light therapy. A fifth essay devoted to the ripening of the rinds of certain fruits by light is also very interesting though only indirectly related to therapy.

When it is considered that Hausser's labors were performed in the richly endowed laboratories of one of the largest electrical concerns in Germany and continued in the physical department of the University of Heidelberg, to the chair of which he was called in 1929, one can appreciate that the late author had unrivaled facilities for both experimental and clinical research. Since virtually every page of the book contains valuable data about his exact findings, it is of course impossible to review the large amount of material. Only one datum can be selected because of our present especial interest in fluorescence. Hausser points out that the skin may fluoresce as do many other substances, and agrees that this phenomenon is due to the absorption of light of lesser wavelength with emission of light of greater wavelength. He rejects Jesionek's concept that by this transformation of light, absorption takes place as a greater depth effect. He argues that it is inconceivable for nature to wander in a round about way in order to transform that fraction of ultraviolet light containing the least energy into visible light, since the sun light, as our strongest source of greatest energy, can penetrate to a vastly greater extent. The support of this idea by experimental work is shown in the fact that fluorescence depends on a wavelength different from that producing skin erythema.

All other experiments and clinical trials are equally interesting and conclusive, and their careful perusal will clarify moot concepts about the therapeutic effects of ultraviolet radiation.

ONE HUNDRED AND FIFTY YEARS OF PUBLISHING 1785-1935. Philadelphia: Lea & Febiger, 1935.

The writer confesses that he was prepared to brush through the pages of this beautiful brochure but found himself captivated by its contents. It presents the extraordinary story of the birth and growth of the house of Lea & Febiger — medical publishers par excellence — and provides a picture of an historical background reaching down to the post revolutionary period of American history. Originally written by that famous scholar and member of the firm, the late Henry Charles Lea, in 1855, to celebrate the one hundredth anniversary of the founding of the present business, it has since been revised and enlarged both in content, illustrations, and title for the benefit of the many friends of the present members of the firm who are celebrating the completion of 150 years of active business. These individuals are to be congratulated on such an illustrious background, and undoubtedly are receiving the warmest felicitations from that large army of established friends for the continuous prosperity of this noted firm of medical publishers. We urge the reader to write for this exquisite and informative book, distributed with the compliments of Lea & Febiger.

THE ACUTE ABDOMEN. By *C. H. Fogge*, M.S. (Lond.), F.R.C.S. (Eng.), Surgeon to Guy's Hospital. Cloth. Pp. 92. Price 2/6 net. London: John Bale, Sons & Danielson, Ltd., 1932.

This brochure belongs to the series of pocket monographs on Practical Medicine and deals in concise form with the important problem of the acute abdomen. In the space of 91 pages the author has managed to introduce the most pertinent facts related to this topic. The subject matter is divided or grouped into three sections. The first reviews the essential objective and subjective symptoms, such as the relation of pain, vomiting, pulse rate, rigidity, the status of the bowels, the significance of temperature, the blood, shock, and methods for rectal and vaginal examinations. The succeeding section evaluates the diagnostic and differential difficulties, and is replete with practical suggestions of value to both internist and surgeon. While it is important to recognize and differentiate the *status praesens* of the patient, it is equally important to know what and when to do something for him. The third part of this monograph deals with the treatment and post-operative management of those affections that have come under the classification of the above title. Here, as also throughout the rest of the work, the author has shown complete orientation with his subject.

ELECTROCARDIOGRAPHY. By *Chauncey C. Maher*, B.S., M.D., Assistant Professor of Medicine, Northwestern University, Attending Internist at the Cook County Hospital and Passavant Memorial Hospital, Chicago. Cloth, Pp 250, with illustrations. Price $4.00. Baltimore: William Wood and Company, 1934.

It is generally admitted that the introduction of electrocardiographic methods of examination to the practice of clinical medicine has been one of the outstanding contributions of the past decade. The work of Lewis, Wenckebach and Winterberg, and others, demonstrated that the electrocardiographic record is a constant phenomenon, varying very little in health but showing definite and concise configurations in disease. With the growing appreciation for this agency in hospital and private practice, there has been a need for a work that was informative, authoritative and understandable in its presentation. These objectives has been successfully consumated in the volume under consideration. For the benefit of clarity and easy comprehension, the author has adhered to concise and terse expression and avoided controversial terrain. In the space of 12 richly illustrated chapters every important and practical phase of the subject — its basic principles and the correlation of the electrocardiogram with clinical findings — has been critically evaluated. Since clinical findings and electrocardiographic interpretations are dependent upon a clear conception or at least upon a broad viewpoint of clinical heart disease, there has been incorporated in outline form terse discussions of various forms of heart involvement, presentation of hypothetical patients, interpretation of the arrhythmias (cardiac mechanism) and a review of the present concept of the conduction system (heart block). Separate chapters are devoted to the exposition of the electrocardiograph, and its "gram," axis deviation, coronary disease, the effect of drugs on the electrocardiogram, routine interpretations, etc. While the author has made no pretense to exhaust the subject, nor to enter upon controversial grounds, he has definitely added to the stature of this subject by presenting the essential facts in the clearest manner and in sufficient detail for practical and clinical purposes.

MANUAL OF THE DISEASES OF THE EYE. For Students and General Practitioners. By *Charles H. May*, M.D., Director and Attending Surgeon, Eye Service, Bellevue Hospital, New York. 1916 to 1926; Consulting Ophthalmologist to Mt. Sinai Hospital, to Bellevue Hospital, to the French Hospital, New York, and to the Monmouth Memorial Hospital; Formerly Chief of Clinic and Instructor in Ophthalmology, College of Physicians and Surgeons, Medical Department, Columbia University, New York. Fourteenth Edition. Cloth. Price, $4. Pp. 496. Baltimore: William Wood & Company, 1934.

The continued favor with which each revised edition of this book is received is simply a testimonial of its extraordinary merit. The fact that fourteen editions have been published in a space of thirty-four years demonstrates the popularity and demand for a volume on a specialty subject which has an appeal not only to the ophthalmologist, but also to the general practitioner. In order to keep the material up to date, some chapters have been rewritten and many additions made. Some illustrations have been replaced, others have been deleted, and a number have been added; among the latter are two additional color plates, one showing the fundus picture of thrombosis of the central vein of the retina, the other illustrating detachment of the retina presenting a large tear. An interesting example of the new material which this new edition contains is the recently advocated electrosurgical procedure for detachment of the retina. There are other references to electrotherapeutic measures, such as electrolysis and electrocoagulation for trichiasis, and radium for rodent ulcer and severe forms of spring catarrh. Mention is made of the use of ultraviolet for tuberculous disease of the eye, phlyctenuler keratitis scleritis, etc. The book is a concise, practical and systematic treatise of diseases of the eye. It should be remembered that the author has endeavored to give the fundamental facts of ophthalmology, omitting excessive detail, extensive discussion, and lengthy accounts of theories and rare conditions. To say that this has been accomplished in an admirable fashion is to compliment the author only mildly. The student, the general practitioner, and the specialist, will do well to have this book available for study or for reference.

A TEXT-BOOK OF HISTOLOGY. The Functional Significance of Cells and Intercellular Substances. By *E. V. Cowdry*, M.D., Professor of Cytology, Washington University, School of Medicine. Cloth. Pp. 503, with 242 illustrations, some in colors. Price, $5.50 net. Philadelphia: Lea & Febiger, 1934.

That medical education is passing through a new and revitalizing period of adjustment is self evident. Due no doubt to the present renaissance from which we are emerging, the entire fabric of the medical curriculum and its presentation is undergoing revolutionary changes. The foregoing volume is representative of this situation, since it offers an authoritative cross-section of the newer trend in medical teaching. Its objective is to give the medical student a broader as well as a more detailed appreciation of micro-anatomy in its functional, rather than its static state. It has aimed to encourage the student to develop an active participation rather than an auditory one in the subject; for, according to Mall and Dewey, the student can learn more by "doing than simply by hearing." Accordingly the obvious and the trite facts of past traditional teachings such as a description of the typical animal cell and that of the cells of various organs and tissues, have been relegated to secondary importance in contrast to the importance of functional cytology found associated in the dynamic structure of the body. The author has logically pointed out that, a "generalized kind of cell which exists alone and can be considered by itself is a figment of the imagination. The properties of each and every cell in the body are directly dependent upon its heredity, the fluid about it, and the other cells associated with it, and

should only be investigated in this connection. The same applies to the so-called elementary tissues, epithelial, connective and so on. These, likewise, do not exist for themselves and by themselves, but function only insofar that they are integrated with the rest. Consequently an attempt is made to build up . . . a conception of cells and elementary tissues in the many environments in which they normally exist. Organs and systems are stressed in order to fulfill the principal aim of the volume, which is to relate structure and function in the whole body—itself the real physiological unit." Thus it is logical that the major theme of this work should concern itself with the blood vascular system and its emphasis of the dynamic conception in the normal as also in the abnormal state. From this point of view Professor Cowdry has presented an impressive exposition which is bound to create increasing disciples because of its timeliness, originality of labor, and the distinct authority with which it is endowed. Each of the 29 chapters contains critical and analytical studies to which has been added the authoritative opinions of representative students of the subject. The references to the literature appended at the end of the book are encyclopedic in scope, this and the index forming an unusual framework for the detailed and scholarly labors involved in the final production of this work. The publishers are to be highly commended for their splendid cooperation, technical and artistic, an artistic impressiveness that blends well with the scholarly labors incorporated in the book.

THE VITAMINS IN HEALTH AND DISEASE. By *Barnett Sure*, Ph.D., Professor of Agricultural Chemistry, University of Arkansas. Cloth, Pp. 206. Price $2.00. Baltimore: The Williams & Wilkins Company, 1933.

It is common knowledge that intimacy with certain experiences often makes us blind to the important facts contained therein and requires special enunciation for permanent appreciation. This work undoubtedly falls into this class of experience, because it is a contribution that points out the full import of the intimate relation of vitamins in health and disease. That it has required many years for medical science to develop an appreciation of this relationship is today an admitted fact. At the present state of our knowledge it is generally agreed that vitamin efficiency and deficiency often are the balance between complete health and of nearly every vagary ascribed as a symptom of disease. Much of this has been verified but not fully appreciated. This work is therefore timely because it brings to our attention the important relationship of the vitamins in the human health equation, and explains their action and properties in relation to such fundamental issues as their influence on infection, growth, appetite, reproduction, secretion of milk, building of bone, and the like. All of these facts are presented in non-technical language and its scope extended to the very realm of immediate interest to medical practice. As pointed out by the author in his introduction, a great deal of mysticism has until recently been attached to any discussion of the vitamin problem, much of this being due to the elaborate technical explanations and equally as much to ignorant speculations. "They were ascribed," he states, "as constituents of foodstuffs, but the chemists had not isolated them as he had definite substances like sugars and minerals. Now some are being isolated in pure state, and the secrecy concerning them is disappearing. The physician is daily gaining more confidence, knowing that they must be supplied abundantly to patients to keep them well, just as his drugs serve the purpose, in certain ailments, to make them well."

Need for a popular but authoritative exposition on the physical, chemical, and physiologic properties of the various vitamins has long been appreciated and has been fulfilled in this work. Dr. Eddy in his foreword expresses his felicitation to the author for the quality of this contribution as an "authoritative summation . . . of information about vitamins . . . in simple, comprehensible language." We add our recommendation to that of Dr. Eddy by repeating his words: "It is a pleasure, therefore, to express this appreciation of his effort and to recommend his text to all interested in the relation of diet to health."

INTERNATIONAL ABSTRACTS

Errors in the Practice of Physical Therapy. Lee A. Hadley.

New York State J. Med. **34**:493 (June 1) 1934.

Mistakes may occur in the prescription or administration of a treatment but more frequently in a disregard of the underlying causes. Every effort should be made to establish a complete pathological picture before instituting any treatment and then base the treatment upon the indications. X-ray is a useful aid in the avoidance of mistakes in treatment. By this means some underlying condition may be discovered which requires surgery or other treatment before the institution of physical therapy. In traumatic cases, the underlying bony structure must be studied. Malalignment of bony parts or bone block cannot be relieved by physical therapy. Forced movement of a joint showing the destruction of articular cartilage is likely to increase the disability.

Too active or too frequent treatment may retard recovery. A sprain of the left sacro-iliac joint may be materially aggravated by too vigorous massage of the lumbar muscles. Discontinuance of all treatments for a few days is sometimes beneficial. Failure may likewise result from lack of cooperation on the part of the patient.

Radiculitis has been responsible for more failures than any other condition treated. Many of patients complain of pain in the arm or shoulder, sometimes with numbness of the hands. The painful parts are treated without success, the causal pathology being located at the roots of the brachial plexus. Proper therapy to the cervical region usually relieves the pain in the arm.

Clinically, the picture varies somewhat depending upon the level involved. Upper cervical radiculitis produces pain in the back of the head. Involvement from midcervical to upper thoracic, produces pain referred to the shoulder and down the arm. If the upper thoracic level is affected, the patient complains of pain in the chest. This is sometimes severe and may simulate angina, pleurisy, or intercostal neuritis. Involvement of the lower dorsal region results in abdominal pain resembling stomach or gallbladder disease, appendicitis, renal and even pelvic disease. Carnett states that many of these patients whose plevic or abdominal symptoms are unrelieved by repeated operations, are frequently suffering from this condition. Lumbar radiculitis, of course, produces pain in the legs. The author has mistaken this for sciatic neuritis. In most cases the condition responds promptly to treatment applied to the proper nerve roots.

Diathermic Treatment of Retinal Detachments. Mark J. Schoenberg.

Pennsylvania M. J., **37**:635 (May) 1934.

Both the Gonin and the Guist methods have given good results in the hands of those who have tried hard to familiarize themselves with these methods. The diathermic method presents among others the following advantages: (1) it is far simpler in application than the Guist method; (2) it does not require an exact localization of the tear as the Gonin method does; (3) it causes no injury to the retina or vitreous; (4) operative and postoperative complications are far less frequent; (5) the percentage of good results is higher in the hands of those who possess the necessary knowledge and experience of selecting the suitable cases and of using the proper technic.

Status, Experiences and Progress of Irradiation. (Stand, Erfahrungen und Fortschritte der modernen Strahlentherapie unter besonderer Berücksichtigung der malignen Tumoren). Georg Ernst.

Deutsche med. Wchnschr. **60**:1008 (July) 1934.

In accordance with Kingery the most intensive effect of x-rays is present on the first day. With unfiltered soft rays after 3½ days it is reduced to 50 per cent, after 7 days to about 25 per cent. Conformably to that falling off of the effectiveness of dosage and to fill up the gap, Pfahler saturates the remaining irradiant quantity to its initial state. With that method of saturation he obtained greater success with irradiation of different tumors. Toleration of the skin was hardly affected by that procedure. Coutard's irradiation method of administering a greater number of small doses of but little intensity obtains a large total of dosage. Being applied in short intervals, for the most part daily, this method is called protracted and is known (as suggested by Schinz) as the so-called protracted-fractional irradiation.

Some new indications for x-ray treatment have been established of late. One method was developed which according to Langeron and Desplats was called functional irradiation treatment. With numerous cases of skin diseases the method resulted in successful influence upon the concerned sympathetic fibres in a way that not only the itching but also the other symptoms of disease were disappearing from the skin. Stimulating deep irradiation of the region of the thymus gland in psoriasis has a similar effect. The author refers to x-ray treatment of bronchial asthma for which stimulating irradiation of the spleen stopped the attack.

Far too little attention is being paid to x-ray treatment of ulcus ventriculi and ulcus duodeni. Patients who did not improve despite the usual therapeutic measures, reported complete relief of pains, increase of appetite, and toleration of food. Moreover occult hemorrhage had disappeared. Recurrences were more seldom in irradiated cases than in those who were operated on.

Success is due to and explained as a tonic (x-ray) effect upon the sympathetic nerve.

X-Ray Treatment of Puerperal Mastitis. (Röntgenbehandling der puerperalen Mastitis). Karl Kautsky.

Wien. med. Wchnschr. **84**:1104 (Oct.) 1934.

The author believes low efficiency x-ray irradiation to be the selective method in treating mastitis. X-ray treatment is superior to short wave treatment. Short wave technic has not yet reached beyond the early stages of experiment while x-ray treatment has met with general employment.

It is suggested that in treating simple puerperal mastitis one should empty the breast, apply a poultice, and tie up the breast. With distinct symptoms of inflammation, lactation of the diseased side should be stopped early, and alcohol dressings applied. If the inflammatory symptoms do not abate, lead ointment has to be applied. In the morning and in the evening the ointment must be removed for examination of the mammary gland. If development of an abscess is shown by rise of temperature and intense pains, irradiation will accelerate the suppuration. That purpose may be accomplished within a few hours. The abscess should be opened by puncture or by puncture incision according to the depth of the process. If the abscess does not heal up within 2 days, irradiation should be repeated. Three days after this, a third exposure may be administered. Should the abscess ripen more slowly with no remarkable pains or rise of temperature, we must await the end of ripening. The abscess will then be evacuated, ultimately irradiated, with one treatment often sufficing.

The author described a case for which he employed: 110 KV effective, 3 ma. dose, 3 H/4 mm. al. filter, size of field 6x6, distance between the focus and the skin 30 cm.

The Rôle of Diathermy in Treating Sterility. (Die Rolle der Diathermie in der Unfruchtbarkeit). Bartholomaeus Von Bodo.

Fortschr. Therap. **10**:605 (Oct.) 1934.

Unquestionably diathermy is far superior to all heating procedures as to intensity and deep effect. It produces hyperemia and stimulates the circulation of the blood. Chiefly for that reason it is employed in the treatment of sterility. Hyperemia produced by diathermy excites the follicles and increases the ovarian function often by jerks. Diathermy ought to be applied in cases of sterility that appear to be due to genital hypoplasia, or as a consequence of atrophy due to disturbances in the circulation, to hematoma, or inflammation. The author has been using diathermy for 5 years in 90 cases, 60 of which being primary, 27 secondarily sterile. Whenever in such cases he aimed to produce a simultaneous heating of the ovaries and direct hyperemia of the uterus he employed the abdominodorsovaginal method. On the other hand when he desired to increase the circulation in the ovary, he applied an inactive flat lead electrode to both sides of the pelvis in the trochanteric region, and an olivary electrode in the vagina. The treatment was repeated every other day. On an average 20-40 exposures were given, each lasting 15-30 minutes. More intensive heat was used at about 43-45 degrees C. The author could observe that out of 20 women treated in that way, 14 became pregnant, 8 who were primarily and 6 who were secondarily sterile. In 6 of the 14 cases hormone therapy also was administered.

Following the author's experiences no pregnancy is to be expected if it does not take place within 6 months after diathermy treatment. Conditions inhibiting fertility in other parts of the genitals (a narrowed cervical canal, hyperplasia of endometrium), diathermy should be tried post operatively.

Effects of Ionization on the Mucosa of Frontal Sinuses of Dogs. Bernard J. McMahon.

Ann. Otol., Rhin. and Laryng. **43**:643 (Sept.) 1934.

It is noteworthy that the principal reaction of the mucosa to the silver colloids was cystologic, a localized leucocytosis, and that this was not any more pronounced as a result of ionization, or any less pronounced without ionization. That is to say, an ionizable solution may react spontaneously to the electrical forces of the tissues themselves, when contact is made for a sufficient length of time, and thus enable the constituent ions to penetrate into the mucosa and instigate an appropriate reaction. According to this hypothesis, ionization has no advantage over passive contact within a cavity lined with mucous membrane, insofar as the local tissue reaction is concerned. But whether this may mean that ionization is ineffectual or that normal tissues possess an ionization limit beyond which they cannot be stimulated, we are not prepared to say. Judging from the leucocytic reaction, it would seem more logical to attribute a bactericidal action, not only to the nascent ions which may be set free, but also to the subsequent phagocytosis of the bacteria by the polymorphonuclear leucocytes, which are attracted to the areas by the ions.

The marked hyperemia alone did not necessarily cause an excess of leucocytosis in the tissues.

The fact that negatively charged carbon particles suspended in a suitable electrolyte were driven into the epithelium demonstrated the power which ionization does possess to facilitate the invasion of otherwise inert foreign partcles.

That certain destructive changes may be brought about was shown by the marked fragmentation of the epithelium, the edema of the subepithelial tissues and the subepithelial hemorrhages which occurred in the mucosa of the sinuses ionized with zinc sulphate solution. From the observations cited, the author draws the following conclusions:

1. Definite destructive changes were brought

about in the mucosa of the frontal sinuses of dogs by the ionization of the zinc sulphate solution. These changes consisted of ballooning, fragmentation and complete destruction of the surface epithelium, a marked edema of the subepithelial tissues and an extravasation of free red blood cells into these tissues from greatly dilated and ruptured capillaries.

2. The specific response of these tissues to the ionization of silver colloids in a polymorphonuclear leucocytosis.

3. The general response of the mucosa of the frontal sinuses of dogs to a galvanic current is an engorgement of the capillaries of the subepithelial tissues.

The Importance of Massage as Practiced by the Physician. J. Grober.

Med. Rec. **140**:254 (Sept. 5) 1934.

It is indeed remarkable that few doctors practice massage, and it is still more remarkable that medical men who know massage and its scientific foundations and appreciate its results avoid applying it. A great number of celebrated physicians did not think it beneath their dignity to practice massage personally. In their clinics, writings, and lectures they have created an important position for massage in therapeutics. Trousseau of Paris, Frerichs, and von Bergmann of Berlin, Castex of Buenos Aires, and Nothnagel of Vienna are glorious names indelibly written in the history of modern massage.

The reason why so few physicians practice massage may be found in the fact that it requires time. It may be observed that patients are willing to pay for indiscriminate rubbing by a lay-masseur and one might draw the conclusion that the patient would prefer to pay a doctor who is really skilled and trained in massage.

The practice of massage as well as the other modalities of physical therapy brings patient and doctor closer together than any other therapy. The doctor employs hand work in the literal sense and gets far more direct information about the bodily condition.

Four or five different manipulations commonly used in massage are described in the text-books. If we observe how a competent physician gives massage we find that he changes and varies his manipulations, his friction, kneading, and stroking according to the requirements of each case.

Only a physician can recognize a change in the pathological picture from day to day. Clinical experience has taught him when and how and with what means at his disposal different conditions, such as edema, a scar, or an adhesion will be best influenced through his manipulation.

Effect of Temperature on Nasal Cilia. Arthur W. Proetz.

Arch. Otolaryng. **19**:607 (May) 1934.

In the course of experiments to investigate the effects of certain salts and drugs on the cilia of the nasal mucosa it becomes apparent that changes in temperature affected the results. By means of an apparatus constructed for the study of cilia in the sinus of the living rabbit, determinations for temperature were made on freshly removed human mucosa and checked against similar ones made on living rabbits. The results were recorded in cinematographs made at normal speeds.

The frequency of heat was greatest between 18 and 33 degrees C. and varied from seven to ten per second. Controls were maintained at room temperature, which varied from 25 to 30 degrees C. The temperature was then reduced very slowly and the speed of the cilia noted. At 18 degrees C. there occurred a slight diminution of rate, which progressed with reduction of temperature until in various specimens all motion ceased at points between 7 and 12 degrees C, the lower temperatures predominating in the sinuses of the living rabbit. Owing to the heat supplied by the animal itself and to the difficulty of observing the cilia while keeping the area at a low temperature, this lower figure is only approximate.

When the temperature was gradually raised, motion was resumed, and by the time the thermometer registered 18 degrees C., it was extremely rapid — much more rapid than at the beginning of the experiment, reaching ten or more per second. This frequency gradually reached the normal once more as the temperature continued to rise.

The practical inferences are twofold: first, that the respiration of cold air does not damage the cilia, especially in view of the fact that inspired cold blasts are constantly alternated with expired ones at 37 degrees C., and second, that if for any reason whatever hot nasal douches are indicated, their temperature should not exceed 40 degrees C., if the cilia are to remain unharmed.

Graduated Muscle Contraction, Its Rationale and Technic. M. Smart.

Brit. J. Phys. Med., 1933, **8**:87; abst., in Canadian Med. A. J. **31**:449 (Oct.) 1934.

To physiologically sustain tissues, a healthy state of arterial, venous and lymphatic circulation is essential. In damaged tissues this function is even more necessary. Muscle contractions and relaxations are a powerful means of promoting and maintaining this situation in both the muscles and the adjoining tissues. To prevent the formation of adhesions which so constantly follow reparative changes it is necessary to eliminate interstitial oedema and the organization of inflammatory exudate. While effusion into tissues is necessary to repair and is beneficial, it must be transitory and never permitted to stagnate. Not only is the organization of effusion to be feared, but its persistence interferes, because of pressure on nutritional channels, with normal local metabolism and starvation results.

Properly instituted, muscle stimulation functions not only in dissipating oedema in the involved area but it also prevents the formation of adhesions between muscle fibres, between tendons and their sheaths, and also between joint surfaces.

The Biologic Action of Radiant Energy: Ultraviolet. Eugene R. Whitmore.

Southern M. J. **27**:796 (Sept.) 1934.

The author found marked and progressive inflammatory changes in the shaved skin of mice irradiated with an efficient quartz-mercury arc lamp; and such mice were killed by a dose (computed on time and distance) above five times the dose that caused a mild second degree erythema of the skin of my forearm. No progressive changes were found in the internal organs of such mice as had been reported by others. This work also showed that mice are not suited for such studies; and it showed the necessity of careful measurement of the dose of ultraviolet radiation, probably of all ultraviolet radiation falling on the exposed surface. The Gordon ultraviolet meter is suitable for this measurement.

Studies of guinea pigs and rabbits, measuring the ultraviolet radiation falling on different sized areas of shaved skin in these animals, show both the guinea pig and the rabbit to be more resistant to ultraviolet radiation than is the mouse, and show both of these animals to be suitable for such studies.

As to how ultraviolet radiation acts on the body, it is agreed that it causes typical inflammation in the exposed skin. As to the general body reaction, it is probable that the effects of ultraviolet radiation are produced in more than one of the ways that have been suggested.

A Year's Work With Ionization in the Treatment of Hay Fever. Arthur M. Alden.

Laryngoscope, **44**:741 (Sept.) 1934.

All of these cases were ionized during the period when the symptoms of the disease were definitely manifest, and four of the adults also had asthma at time of the ionization. Eleven of these patients had previously been treated by desensitization, but with unsatisfactory results. Five had received only local treatment, and three, including the child, had received no treatment of any sort.

The results of the ionization in this group were immediate and complete relief in each case of all allergic symptoms for the remainder of the season. The promptness with which the eye symptoms and the nasal itching abated following the treatment was spectacular. In all of these cases the nose was entirely blocked with a membrane the day following the ionization. The conclusions drawn from this study were:

1. Nasal ionization following the technic elaborated by Warwick when given after the hay-fever symptoms have started apparently stops the disease in the majority of patients for the remainder of the season.
2. About 50 per cent of these patients are free of symptoms during the second season.
3. When the treatment is given prior to the beginning of the pollen season, about half of the patients appear to be completely protected.
4. Clinical observation and microscopical examination of nasal tissue have thus far shown no evidence of permanent nasal damage following ionization.

Effect of Radio Knife on Wound Healing. Arch E. Spelman.

Am. J. Surg. **23**:364 (Feb.) 1934.

Agglutination of tissue surfaces by fibrillar fibrin developing in plastic exudate is essential to primary wound healing. This cannot be expected to occur in wounds made by the radio knife unless the coagulum formed on the wound surfaces is removed. Wound healing will be retarded in direct proportion to the efficiency of the electric knife in producing hemostasis.

Cancer of the Bladder.

J. of Urol. **31**:423 (April) 1934.

Nine hundred and two epithelial tumors of the bladder submitted to the Carcinoma Registry of the American Urological Association by seventy-seven contributors are reviewed. The sex incidence in this series is 76.25 per cent for the male and 23.75 for the female. The peak age incidence was from 55 to 59 years, 61.78 per cent occurred between the ages of 50 and 69 years. Sixteen epithelial tumors of the bladder occurred among anilin dye workers. A family history of cancer is of no apparent significance in bladder carcinoma. The tumors involving the lateral walls, trigone and bladder neck constitute 76.6 per cent of all the tumors in this series. Less than half of the tumors in these locations are highly malignant while three of every four vault tumors are of grades 3 and 4. Location of the tumor has little apparent relation to prognosis except in the vault, in which location the prognosis for five years is 18.7 per cent. Forty-five per cent of the tumors in this series were larger than 5 cm. in diameter when first observed. When the tumor was less than 2 cm. in diameter, the results were greatly improved. Approximately ten per cent of the cases in this series were found to have metastases. The incidence of metastasis is probably higher. Loss of weight constituted a major complaint in slightly more than one-fourth of the patients. Blood was found in the urine in 76.1 per cent of the cases. More careful postoperative preparation of the patient with bladder carcinoma is urged as a means of reducing the operative mortality. Slightly more than one-third of the patients were found to have serious impairment of renal function. Cystoscopic examination, biopsy, and radiographic examination are the principal means of diagnosis and are shown to be highly accurate in this series. The standard methods of treatment exhibited in this series are resection, fulguration and radiation. Of 349 cases observed five years or more, 33.24 per cent were alive at the end of five years.

Transurethral Resection of Prostatic Bars, Hypertrophies, and Cancer. Edgar G. Ballenger, Omar F. Elder, and Harold P. McDonald.

North Carolina Med. & Surg. J. **86**:652 (April) 1934.

Nearly all of 180 resections have been done under low spinal anesthesia. Spinocaine has been employed in the usual manner, except after the needle has been inserted, the table is tilted so as to lower

the patient's head before the solution lighter than spinal fluid, is injected. This tends to keep the anesthesia low, almost eliminates nausea and lessens the number who have a drop in blood pressure.

If the amount of tissue to be resected is small, only about one-half the usual dose is given; if the gland is large and a long anesthesia is needed, the full amount is given.

A 28 F sound is introduced and allowed to remain in the urethra from three to five minutes before the resectoscope is introduced. This facilitates the passage of the resectoscope. If the exact condition of the bladder, vesical neck, and prostatic urethra has not already been determined cystoscopically careful inspection is made before the resection begins.

With bars and fibrous contractions, the removal of tissue is started at six o'clock and continues until all obstruction is removed. With protruding masses, the resection is started at the middle or lateral lobe, leaving the other side as an undisturbed landmark as long as is feasible. Bleeding, if of any consequence, is checked by the coagulating current applied while the electrode is being moved over the bleeding area or vessel. In this manner the bleeders are more easily stopped, leaving only a thin layer of coagulated tissue. If at any point excessive coagulation has been required, a slow cut is made at this place, taking away the deeply coagulated area and thereby lessening the tendency of late bleeding. Clear vision of the area being resected is always essential. Care is taken never to overdistend the bladder and never to make a cut at the verumontanum or anterior to it.

After removing sufficient tissue to make the area between the verumontanum and the uretral openings look like the normal vesical neck, a finger is placed in the rectum and prostatic masses if present are pushed toward the resecting loop until the removal of tissue seems adequate. Pieces which may have fallen back into the bladder are now removed by the loop, forceps or suction. After the resected area is carefully inspected for bleeding or oozing areas, which are lightly but completely coagulated, a 22 F catheter is inserted and fixed in place with adhesive plaster The patient is returned to his room, with his head still lowered, and this position is maintained for two or three hours. Care is taken that the catheter continues to drain. The patient is given liquids freely and, if needed, glucose intravenously, saline solution, and cardiac stimulation. The catheter is removed in 48 to 72 hours unless the patient is exceedingly weak; he is allowed to get up on the third or fourth day and on the day following the average patient is allowed to leave the hospital, if his home is near by. The usual postoperative stay in the hospital has been five days.

X-Ray Therapy of Eczema. (Die Röntgenbehandlung des Ekzems. E. Hesse.

Deutsche med. Wchnschr. **59**, II, 1320, 1933.

X-ray therapy is recognized as the treatment of choice for all types and states of eczema. The x-rays exhibit an elective effect upon pathological proliferation in the Malpighian layer. They prove very effective in eczemas still persistent after the mechanical, chemical or bacterial causes are eliminated. Many eczemas recur after temporary improvement, obtained by x-ray therapy. In most of these cases internal causes of the allergy still persist, such as functional disturbances in the alimentary tract, sensitivity to certain foodstuffs, or some local conditions (intertrigo, hemorrhoids). Continued x-ray treatment is dangerous in these cases and should be replaced by the study and rational treatment of the underlying cause.

Short Wave Treatment In Gynecology. (Kurzwellentherapie in der Gynäkologie.) Kurt Dalchau.

Deutsche med. Wchnschr. **60**:1765 (Nov.) 1934.

Short electric waves are generally used within a range of 4-30 meters, a wave of 15 meters being preferred to all others. The author applied a 9 meter wavelength. With short wave treatment we obtain a deep effect of considerable heating intensity, exceeding the deep effect of diathermy. Resistance of the tissue does not play a rôle in short wave irradiation. A small supply of energy suffices to penetrate the skin; no excessive heat must be produced as is required with diathermy. A great advantage of short wave application is that hardly any burning of the skin occurs. The author alludes to the contraindication for diathermy in acute (also in subacute) abdominal inflammation; while short wave irradiation and penetration may be practicable even in inflammatory processes with high fever. Consequently short wave treatment in gynecology has proved far superior to diathermy with all inflammatory conditions of the adnexa, for which it proved successful. In subacute and chronic adnexitis success was far greater than that with diathermy. In the majority of cases the processes were entirely removed.

The treatment of pelveoperitonitis was attended by most beneficial results, as it was with adnexitis following acute gonorrhea. A few exposures (for many cases not any more than 2-3) produced alleviation of subjective troubles and abatement of fever. After 10-15 exposures retrogression of the inflammatory symptoms took place. Very good results were obtained in mastitis. In acute cases retrogression was seen after 3-5 exposures, while in the advanced stage suppuration was favored, permitting early puncture-incision. Subjective complaints abated readily, in some cases after the very first exposure.